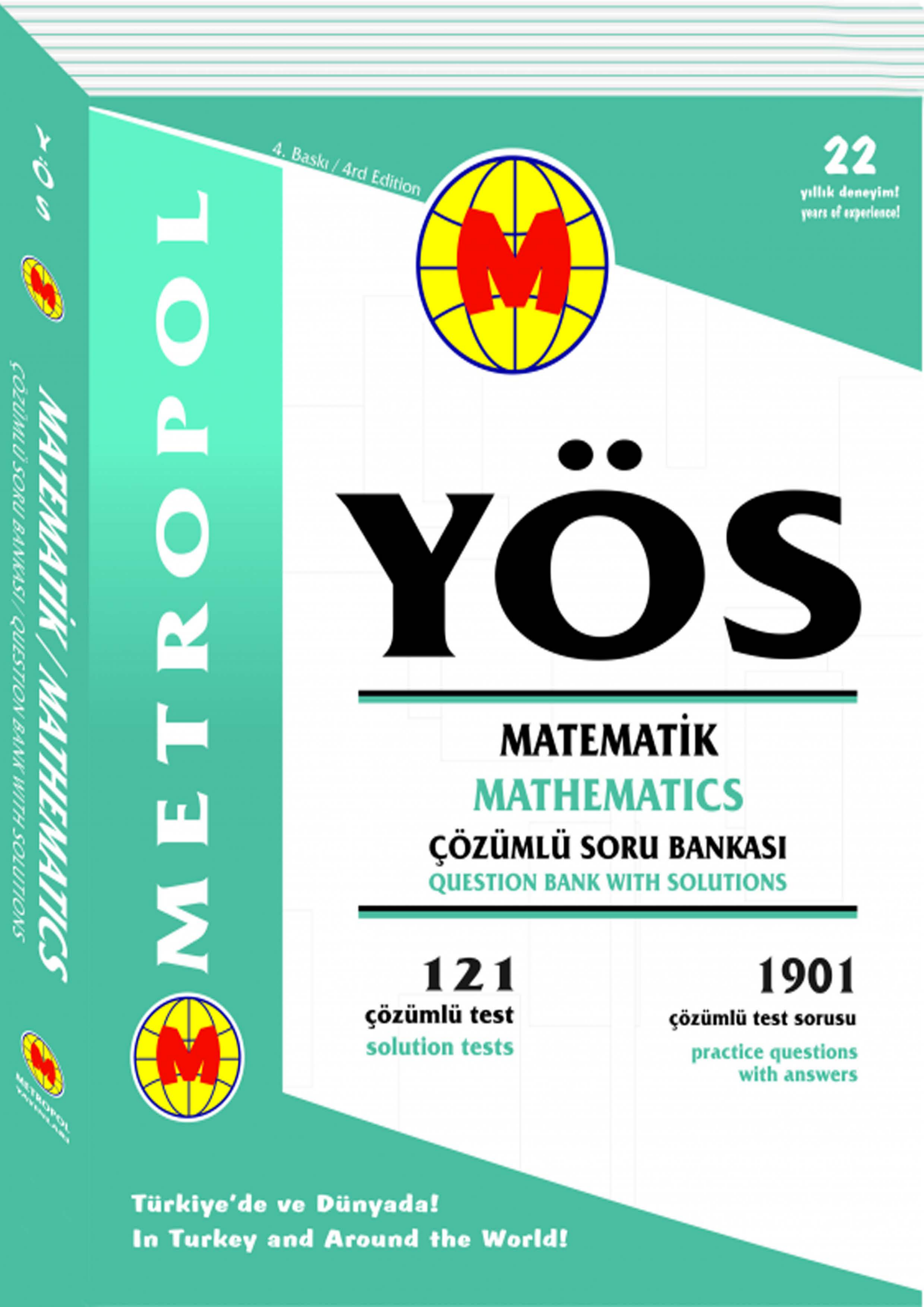

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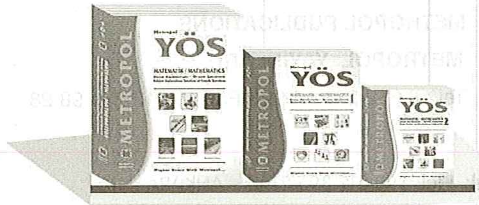

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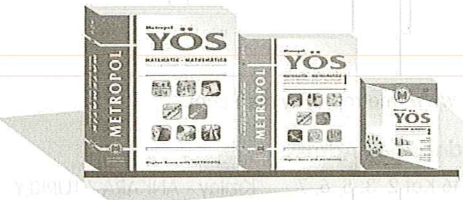

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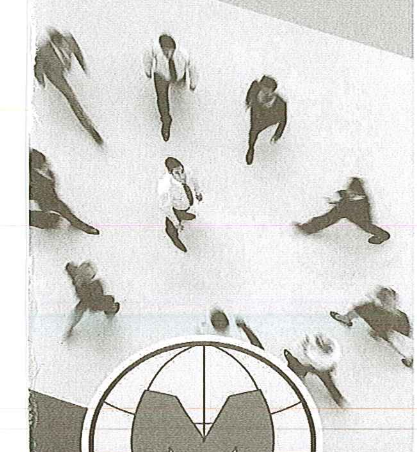

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Değerli YÖS adayları;

METROPOL, YÖS'e hazırlanan öğrencilere **20** yıldır kurs ve yayın desteği ile rehberlik hizmetleri de sunan köklü bir eğitim kuruluşudur.

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Bu kitap, YÖS'e uygun olarak hazırlanmış **1901 çözümlü test sorusu içermektedir.**

Başarıya ulaşmak için YÖS yayınlarını hazırlayan uzman öğretmenlerimizden destek almanızı ve YÖS hazırlık kurslarımıza katılmanızı öneriyoruz.

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PREFACE

Dear YÖS candidates;

METROPOL, is a well-established educational institution which has provided students with a comprehensive training assistance on courses an publications for more than **20** years. In parallel, **METROPOL** has been in the service of guidance for you.

The Examination for Foreign Students, referred to as YÖS, has been designed for foreign students wishing to study in Higher Education Institutions in Turkey. Depending on the results of this examination, they can apply to Turkish Institutions of Higher Education. YÖS consists of two different parts as follows: **Basic Learning Skills Test and Turkish Language Proficiency Test.** In order to study in the best universities in Turkey, first of all, you need to have received at least a **40** standard score and then, aim at receiving more than this score in the Basic Learning Skills Test. Considering that **45** questions of the Basic Learning Skills Test, which are composed of **80 questions** in total, are related to **IQ** issues, answering majority of the questions as correct will directly result in receiving high score in YÖS.

This book which was prepared in accordance with YÖS consists of **1901 test with solutions** in actual exam format.

In order to be successful at, we advice you get training assistance from our qualified educators and you attend our preparation courses for YÖS.

We wish you become successful at YÖS for all students.

METROPOL
EDUCATIONAL INSTITUTIONS

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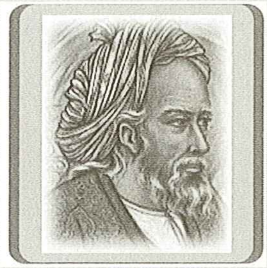
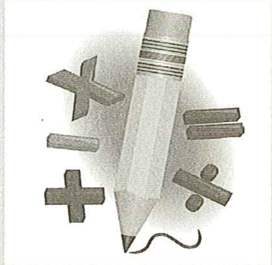
ÜNİTE 1
UNIT

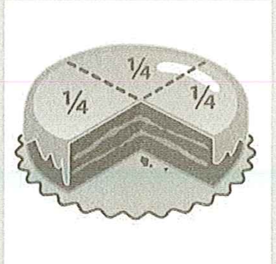
Omar Khayyam
[1048 – 1122]

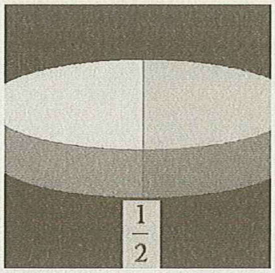
Ömer Hayyam, anlaşılması güç matematiksel konuları, şiirsel bir dille açıklayan, derin felsefi bilgisi olan bir düşünür ve şairdir. O astronomik tablolar oluşturarak, yeni bir takvimin ortaya çıkmasında katkıda bulunmuştur. Ayrıca bir çemberin, bir parabol ile kesişiminden oluşan ve üçüncü dereceden denklemleri içeren problemleri çözerek yeni geometrik yöntemler de geliştirmiştir.

Omar Khayyam was a scholar who was a poet as well as a mathematician. He compiled astronomical tables and contributed to calendar reform and discovered a geometrical method of solving cubic equations by intersecting a parabola with a circle.









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✓ NUMBERS . . . . 3 – 26
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SAYILAR / NUMBERS

BÖLÜM
CHAPTER
1

Sayılar / Numbers

Test 1

1. $3 - \{[(-2) - (-2) + (-5)] - (-4)\} = ?$

A) 4 B) 5 C) 6 D) 7 E) 8

2. $12 \cdot (3:4) - (12:3) \cdot 4 = ?$

A) –4 B) –5 C) –6 D) –7 E) –8

3. $6 - 4:2 - 2 \cdot [(6:3) \cdot 2 - 4] = ?$

A) 3 B) 4 C) 5 D) 6 E) 8

4. $[2 \cdot (2 + 4)] = ?$

A) 3 B) 2 C) 12 D) 10 E) 9

5. $(3 - 5) - (7 - 9) + (17 - 9) - (5 - 4) = ?$

A) 5 B) 6 C) 7 D) 8 E) 9

6. $2 + 4 \cdot 3 + 27 : 9 - [3 + (8:2)] = ?$

A) 6 B) 7 C) 8 D) 9 E) 10

7. $\dfrac{AB + BA}{AA} = 4 \Rightarrow \max(B - A) = ?$

A) 6 B) 7 C) 8 D) 9 E) 12

8. $AB + BA = 110$

$AB - BA = 36$

$\Rightarrow 3A + 2B = ?$

A) 10 B) 18 C) 23 D) 27 E) 33

9. A + B = 7

B + C = 4

⇒ **A + C + 2B = ?**

A) 7 B) 8 C) 9 D) 10 E) 11

10. A − 3 = B

B − 3 = C

C − 3 = D ⇒ **A − D = ?**

A) 9 B) 10 C) 11 D) 12 E) 13

11. $\left.\begin{array}{l} 2A+B=32 \\ B-C=4 \end{array}\right\} \Rightarrow \mathbf{2A+C=?}$

A) 19 B) 21 C) 28 D) 29 E) 37

12. 3A − B = 13

A + 5B = 15

⇒ **A + B = ?**

A) 5 B) 7 C) 9 D) 11 E) 13

13.

$$\begin{array}{r|l} A & B \\ \cline{2-2} - & 5 \\ \hline 1 & \end{array} \qquad \begin{array}{r|l} B & C \\ \cline{2-2} - & 4 \\ \hline 2 & \end{array} \quad \Rightarrow \quad \begin{array}{r|l} \mathbf{A} & \mathbf{20} \\ \cline{2-2} - & \\ \hline \mathbf{?} & \end{array}$$

A) 9 B) 10 C) 11 D) 12 E) 13

14.

$$\begin{array}{r|l} A & 15 \\ \cline{2-2} - & 4 \\ \hline B & \end{array} \quad \Rightarrow \quad \mathbf{max(A) = ?}$$

A) 70 B) 74 C) 75 D) 76 E) 77

15.

$$\begin{array}{r|l} A & C+1 \\ \cline{2-2} & 4 \\ - & \\ \hline C & \end{array} \qquad \begin{array}{r|l} B & C \\ \cline{2-2} & 5 \\ - & \\ \hline 3 & \end{array} \quad \Rightarrow \quad \mathbf{B - A = ?}$$

A) −1 B) 4 C) 5 D) 6 E) 7

16.

$$\begin{array}{r|l} A & 7 \\ \cline{2-2} & B \\ - & \\ \hline 3 & \end{array} \qquad \begin{array}{r|l} A+5 & B+1 \\ \cline{2-2} & 7 \\ - & \\ \hline C & \end{array} \quad \Rightarrow \quad \mathbf{C = ?}$$

A) 0 B) 1 C) 2 D) 3 E) 4

Yanıtlar / Answers

1. A	4. C	7. A	10. A	13. C	16. B
2. D	5. C	8. D	11. C	14. B	
3. B	6. E	9. E	12. B	15. A	

1. $3 - \{[(-2) - (-2) + (-5)] - (-4)\}$

$= 3 - [(-2 + 2 - 5) + 4]$

$= 3 - [(-5) + 4]$

$= 3 - (-1)$

$= 4$

Yanıt / Answer A

2. $12 \cdot (3:4) - (12:3) \cdot 4$

$= (12 \cdot 3):4 - 4 \cdot 4$

$= 36:4 - 16$

$= 9 - 16$

$= -7$

Yanıt / Answer D

3. $6 - 4:2 - 2 \cdot [(6:3) \cdot 2 - 4]$

$= 6 - 2 - 2 \cdot [2 \cdot 2 - 4]$

$= 4 - 2 \cdot 0$

$= 4$

Yanıt / Answer B

4. $[2 \cdot (2 + 4)]$

$= [2 \cdot (2+4)]$

$= [2 \cdot 6]$

$= 12$

Yanıt / Answer C

5. $(3 - 5) - (7 - 9) + (17 - 9) - (5 - 4)$

$= (-2) - (-2) + 8 - 1$

$= -2 + 2 + 7$

$= 7$

Yanıt / Answer C

6. $2 + 4 \cdot 3 + 27 : 9 - [3 + (8:2)]$

$= 2 + 12 + 3 - (3 + 4)$

$= 17 - 7$

$= 10$

Yanıt / Answer E

7. $\dfrac{AB + BA}{AA} = 4$

$\dfrac{10A + B + 10B + A}{11A} = 4$

$$\left.\begin{aligned} \frac{11(A+B)}{11A} &= 4 \\ \frac{A+B}{A} &= 4 \end{aligned}\right\} \Rightarrow \quad \begin{array}{c} A + B = 4A \\ B = 3A \\ \hline A = 3 \Rightarrow B = 9 \end{array}$$

$\Rightarrow \max(B - A) = 9 - 3 = 6$

Yanıt / Answer A

8.

$$\begin{array}{rl} & AB + BA = 110 \\ + & AB - BA = 36 \\ \hline & 2 \cdot (AB) = 146 \\ & AB = 73 \end{array}$$

$\Rightarrow A = 7, \quad B = 3$

$3A + 2B = 3 \cdot 7 + 2 \cdot 3$

$= 21 + 6 = 27$

Yanıt / Answer D

9.

$$\begin{array}{r} A+B=7 \\ +\quad B+C=4 \\ \hline A+2B+C=11 \end{array}$$

Yanıt / Answer E

10.

$$\begin{array}{r} A-3=B \\ B-3=C \\ +\quad C-3=D \\ \hline A+B+C-9=B+C+D \end{array}$$

$$A-9=D$$

$$A-D=9$$

Yanıt / Answer A

11. $B-C=4 \Rightarrow C-B=-4$

$$\begin{array}{r} 2A+B=32 \\ +\quad C-B=-4 \\ \hline 2A+C=28 \end{array}$$

Yanıt / Answer C

12.

$$\begin{array}{r} 3A-B=13 \\ +\quad A+5B=15 \\ \hline 4(A+B)=28 \end{array}$$

$$A+B=7$$

Yanıt / Answer B

13. $\left.\begin{array}{l} A=5B+1 \\ B=4C+2 \end{array}\right\} \Rightarrow A=20C+11$

$$\begin{array}{r|l} 20C+11 & 20 \\ \cline{2-2} - & \\ \hline 11 & \end{array}$$

Yanıt / Answer C

14. $A=15 \cdot 4+B$

$B<15 \Rightarrow \max(B)=14$

$\max(A)=15 \cdot 4+14=74$

Yanıt / Answer B

15.

$$\begin{array}{r|l} A & C+1 \\ \cline{2-2} & 4 \\ - & \\ \hline C & \end{array} \qquad\qquad \begin{array}{r|l} B & C \\ \cline{2-2} & 5 \\ - & \\ \hline 3 & \end{array}$$

$A=4(C+1)+C$ $\qquad B=5C+3$

$A=5C+4$

$\Rightarrow B-A=5C+3-(5C+4)$

$B-A=-1$

Yanıt / Answer A

16.

$$\begin{array}{r|l} A & 7 \\ \cline{2-2} & B \\ - & \\ \hline 3 & \end{array} \qquad\qquad \begin{array}{r|l} A+5 & B+1 \\ \cline{2-2} & 7 \\ - & \\ \hline C & \end{array}$$

$A=7B+3$ $\qquad A+5=7B+7+C$

$7B+3+5=7B+7+C$

$C=1$

Yanıt / Answer B

1. **$2 + (4 \cdot 3) + (8 : 4) - [5 - (6 : 2)] = ?$**

A) 16 B) 14 C) 12 D) 10 E) 8

2. **$-12 - (-3) \cdot (-6) - [8 - (-1) - 5] - 3 = ?$**

A) –37 B) –33 C) –31 D) –27 E) –23

3. **$[-6^2 + (-6)^2 : (-3)] : [(-2)^3 + 2^2] = ?$**

A) –12 B) –8 C) –4 D) 8 E) 12

4. **$x - [\,-(y + z) + 3 \cdot (x + z) + 2(y - x)] = ?$**

A) $3x - 2y$ B) $-2y - 2z$ C) $2z - 2y$
D) $-y - 2z$ E) $y - z$

5. **$-3 - 5 \cdot 4 + 6 : (2 - 8) = ?$**

A) –6 B) –12 C) –24 D) –28 E) –36

6. $AB - BB + BA = 77 \Rightarrow$ **$A = ?$**

A) 3 B) 4 C) 5 D) 6 E) 7

7. $AB + BA = 5(A + B) + 72 \Rightarrow$ **$A + B = ?$**

A) 8 B) 9 C) 10 D) 12 E) 13

8. $x = ABC6 \Rightarrow$ **$ABC62 = ?$**

A) $10x + 48$ B) $10x + 36$ C) $10x + 24$
D) $10x + 16$ E) $10x + 2$

9. AB – BA = 54 ⇒ **max(AB) + min(AB) = ?**

A) 72 B) 86 C) 153 D) 164 E) 176

10. $a, b \in N^+$, $a \neq b$

$a + b = 22$

⇒ **max(a·b) + min(a·b) = ?**

A) 117 B) 119 C) 120 D) 141 E) 142

11. ABC, CBA ∈ N, A ≠ B

ABC – CBA = 495

⇒ **max(A + B + C) = ?**

A) 19 B) 21 C) 22 D) 24 E) 25

12.

$$\begin{array}{r|l} A & 8 \\ \hline - & 7 \\ B & \end{array} \qquad \begin{array}{r|l} C & B \\ \hline - & 5 \\ 6 & \end{array} \Rightarrow \mathbf{A = ?}$$

A) 59 B) 60 C) 61 D) 62 E) 63

13.

$$\begin{array}{r|l} ABC & AB \\ \hline - & x \\ y & \end{array} \qquad x + y = 16 \Rightarrow \mathbf{y = ?}$$

A) 2 B) 3 C) 4 D) 5 E) 6

14.

$$\begin{array}{r|l} AA & 8 \\ \hline - & A \\ 6 & \end{array} \Rightarrow \mathbf{A^2 + 2^A = ?}$$

A) 48 B) 32 C) 16 D) 8 E) 4

15.

$$\begin{array}{r|l} ABC & 48 \\ \hline - & x \\ x^2 & \end{array} \quad \max(x) \Rightarrow \mathbf{A + B + C = ?}$$

A) 11 B) 10 C) 9 D) 8 E) 7

16.

$$\begin{array}{r|l} ABC & 7 \\ \hline - & x+6 \\ x-2 & \end{array} \Rightarrow \mathbf{\max(ABC) = ?}$$

A) 102 B) 104 C) 108 D) 110 E) 112

Yanıtlar / Answers

1. B	4. D	7. D	10. D	13. E	16. B
2. A	5. C	8. E	11. B	14. D	
3. E	6. E	9. D	12. E	15. C	

1. $2 + (4 \cdot 3) + (8 : 4) - [5 - (6 : 2)]$

$= 2 + 12 + 2 - (5 - 3)$

$= 16 - 2 = 14$

Yanıt / Answer B

2. $-12 - (-3) \cdot (-6) - [8 - (-1) - 5] - 3$

$= -12 - 18 - (8 + 1 - 5) - 3$

$= -30 - 4 - 3 = -37$

Yanıt / Answer A

3. $[-6^2 + (-6)^2 : (-3)] : [(-2)^3 + 2^2]$

$= [-36 + 36 : (-3)] : [-8 + 4]$

$= [-36 + (-12)] : (-4)$

$= (-48) : (-4) = 12$

Yanıt / Answer E

4. $x - [\,-(y + z) + 3 \cdot (x + z) + 2(y - x)]$

$= x - (-y - z + 3x + 3z + 2y - 2x)$

$= x - (x + y + 2z)$

$= x - x - y - 2z$

$= -y - 2z$

Yanıt / Answer D

5. $-3 - 5 \cdot 4 + 6 : (2 - 8)$

$= -3 - 20 + 6 : (-6)$

$= -23 + (-1)$

$= -24$

Yanıt / Answer C

6. $AB - BB + BA = 77$

$10A + B - (10B + B) + 10B + A = 77$

$11A + 11B - 11B = 77$

$11A = 77$

$A = 7$

Yanıt / Answer E

7. $AB + BA = 5(A + B) + 72$

$10A + B + 10B + A = 5(A + B) + 72$

$11(A + B) = 5(A + B) + 72$

$6(A + B) = 72$

$A + B = 12$

Yanıt / Answer D

8. $ABC6 = x$

$ABC60 = 10x$

$ABC60 + 2 = 10x + 2$

$ABC62 = 10x + 2$

Yanıt / Answer E

9.

$$\begin{aligned} AB - BA &= 54 \\ 10A + B - (10B + A) &= 54 \\ 9A - 9B &= 54 \\ 9(A - B) &= 54 \\ A - B &= 6 \end{aligned}$$

$\max(AB) = 93$

$\min(AB) = 71$

$\Rightarrow \max(AB) + \min(AB) = 164$

Yanıt / Answer D

10.

$$\left.\begin{aligned} & a + b = 22\ ,\ a \neq b \\ & \max(a \cdot b) = 120 \\ & \min(a \cdot b) = 21 \end{aligned}\right\} \Rightarrow \max(a \cdot b) + \min(a \cdot b) = 141$$

Yanıt / Answer D

11.

$ABC - CBA = 495$

$100A + 10B + C - 100C - 10B - A = 495$

$99A - 99C = 495$

$A - C = 5 \ \Rightarrow\ \max(A) = 9,\ \max(C) = 4$

$\max(A + B + C) = 9 + 8 + 4$

$= 21$

Yanıt / Answer B

12.

$$\left.\begin{aligned} & \begin{array}{r|l} A & 8 \\ \cline{2-2} - & 7 \\ \hline B & \end{array} \quad \Rightarrow B < 8 \\ & \begin{array}{r|l} C & B \\ \cline{2-2} - & 5 \\ \hline 6 & \end{array} \quad \Rightarrow B > 6 \end{aligned}\right\} \Rightarrow B = 7$$

$A = 7 \cdot 8 + B$

$A = 56 + 7 = 63$

Yanıt / Answer E

13.

$$\begin{array}{r|l} ABC & AB \\ \cline{2-2} -\ AB & 10 \\ \hline 00C & \end{array}$$

$$\left.\begin{aligned} x &= 10 \\ y &= C \end{aligned}\right\} \Rightarrow 10 + C = 16$$

$C = 6$

Yanıt / Answer E

14.

$$\begin{array}{r|l} AA & 8 \\ \cline{2-2} - & A \\ \hline 6 & \end{array}$$

$AA = 8 \cdot A + 6$

$11A = 8 \cdot A + 6$

$3A = 6$

$A = 2 \ \Rightarrow\ A^2 + 2^A = 2^2 + 2^2 = 8$

Yanıt / Answer D

15.

$$\begin{array}{r|l} ABC & 48 \\ \cline{2-2} - & x \\ \hline x^2 & \end{array}$$

$x^2 < 48$

$\max(x) = 6$

$$\begin{aligned} ABC &= 48 \cdot x + x^2 \\ &= 48 \cdot 6 + 6^2 \\ &= 324 \end{aligned}$$

$\Rightarrow A + B + C = 3 + 2 + 4 = 9$

Yanıt / Answer C

16.

$$\begin{array}{r|l} ABC & 7 \\ \cline{2-2} - & x + 6 \\ \hline x - 2 & \end{array}$$

$x - 2 < 7$

$x < 9$

$\max(x) = 8$

$ABC = 7 \cdot (x + 6) + x - 2$

$\Rightarrow \max(ABC) = 7 \cdot (8 + 6) + 8 - 2 = 104$

Yanıt / Answer B

1. $25 + 26 + 27 + \ldots + 100 = ?$

A) 4500 B) 4525 C) 4700 D) 4725 E) 4750

2. $7 + 8 + 9 + \ldots 90 + 91 + 90 + 89 + \ldots + 8 + 7 = ?$

A) 8169 B) 8189 C) 8219 D) 8239 E) 8269

3. $3 + 6 + 9 + \ldots + 108 = ?$

A) 1980 B) 1989 C) 1990 D) 1998 E) 1999

4. $\frac{2}{3} + \frac{4}{3} + \frac{6}{3} + \ldots + 10 = ?$

A) 80 B) 78 C) 75 D) 72 E) 70

5. $\frac{1+2+3+\ldots+101}{51} = ?$

A) 99 B) 100 C) 101 D) 102 E) 103

6. $\frac{(6+12+18+\ldots+96)^2}{(12+24+36+\ldots+192)^2} = ?$

A) $\frac{1}{2}$ B) $\frac{1}{4}$ C) $\frac{1}{8}$ D) $\frac{1}{10}$ E) $\frac{1}{12}$

7. $11 + 13 + 15 + \ldots + (2n-1) = 375$

$\Rightarrow$ n = ?

A) 10 B) 15 C) 18 D) 20 E) 25

8. $\frac{3}{2} + \frac{9}{2} + \frac{15}{2} + \ldots + \frac{6n-3}{2} = \frac{75}{2} \quad \Rightarrow \quad n = ?$

A) 3 B) 5 C) 7 D) 9 E) 11

9. **$2 - 3 + 4 - 5 + \ldots + 34 - 35 = ?$**

A) -19 B) -18 C) -17 D) 17 E) 18

10. $5 + 7 + 9 + \ldots + n = A$

$8 + 10 + 12 + \ldots + (n - 1) = B$

$A + B = 309 \Rightarrow$ **$n = ?$**

A) 25 B) 27 C) 29 D) 31 E) 33

11. $1 + 2 + 3 + \ldots + x = A$

$21 + 22 + 23 + \ldots + x = B$

$A + B = 462 \Rightarrow$ **$A = ?$**

A) 210 B) 246 C) 314 D) 336 E) 388

12. **$6 + 14 + 22 + \ldots + 118 = ?$**

A) 465 B) 645 C) 780 D) 840 E) 930

13. $9 + 11 + 13 + \ldots + (2n - 1) = 240$

$\Rightarrow$ **$n = ?$**

A) 8 B) 10 C) 16 D) 18 E) 20

14. $A = 4 + 5 + 6 + \ldots + n + n + 1$

$B = 1 + 2 + 3 + \ldots + n - 2$

$A - B = 189 \Rightarrow$ **$n = ?$**

A) 58 B) 65 C) 70 D) 72 E) 80

15. $\dfrac{6+12+18+\ldots+108}{4+8+12+\ldots+72} = \dfrac{2n}{3} \Rightarrow n = ?$

A) $\dfrac{9}{4}$ B) $\dfrac{3}{2}$ C) 1 D) 2 E) 3

16. $2 + 4 + 6 + \ldots + 2n = 1260 \Rightarrow$ **$n = ?$**

A) 35 B) 36 C) 37 D) 39 E) 40

Yanıtlar / Answers

1. E	4. A	7. D	10. A	13. C	16. A
2. D	5. C	8. B	11. D	14. B	
3. D	6. B	9. C	12. E	15. A	

1. $$25+26+27+\cdots+100=\frac{100\cdot 101}{2}-\frac{24\cdot 25}{2}=4750$$

Yanıt / Answer E

2. $$7+8+9+\dots+90+91+90+89+\dots+8+7$$
$$=2(7+8+9+\dots+90)+91$$
$$=2\cdot\left[\frac{90\cdot 91}{2}-\frac{6\cdot 7}{2}\right]+91$$
$$=8239$$

Yanıt / Answer D

3. $$3+6+9+\dots+108$$
$$=3\cdot(1+2+3+\dots+36)$$
$$=3\cdot\frac{36\cdot 37}{2}$$
$$=1998$$

Yanıt / Answer D

4. $$\frac{2}{3}+\frac{4}{3}+\frac{6}{3}+\dots+10$$
$$=\frac{2}{3}+\frac{4}{3}+\frac{6}{3}+\dots+\frac{30}{3}$$
$$=\frac{2+4+6+\dots+30}{3}$$
$$=\frac{2\cdot(1+2+3+\dots+15)}{3}$$
$$=\frac{2\cdot\frac{15\cdot 16}{2}}{3}=5\cdot 16=80$$

Yanıt / Answer A

5. $$\frac{1+2+3+\dots+101}{51}=\frac{\frac{101\cdot 102}{2}}{51}=\frac{101\cdot 51}{51}=101$$

Yanıt / Answer C

6. $$\frac{(6+12+18+\dots+96)^2}{(12+24+36+\dots+192)^2}$$
$$=\frac{[6(1+2+3+\dots+16)]^2}{[12(1+2+3+\dots+16)]^2}$$
$$=\frac{6^2(1+2+3+\dots+16)^2}{12^2(1+2+3+\dots+16)^2}$$
$$=\frac{6^2}{12^2}=\left(\frac{6}{12}\right)^2=\frac{1}{4}$$

Yanıt / Answer B

7. $11 + 13 + 15 + \dots + (2n - 1) = 375$

$1 + 3 + 5 + 7 + 9 + 11 + 13 + \dots + (2n - 1) = 375 + 25$

$1 + 3 + 5 + 7 + 9 + 1 + 3 + \dots (2n - 1) = 400$

$n^2 = 400$

$n = 20$

Yanıt / Answer D

8. $$\frac{3}{2}+\frac{9}{2}+\frac{15}{2}+\dots+\frac{6n-3}{2}=\frac{75}{2}$$
$$\frac{3+9+15+\dots+(6n-3)}{2}=\frac{75}{2}$$
$$3\cdot(1+3+5+\dots+(2n-1))=75$$
$$1+3+5+\dots+(2n-1)=25$$
$$n^2=25$$
$$n=5$$

Yanıt / Answer B

9. $2-3+4-5+\cdots+34-35$

$$=\underbrace{2-3}_{-1}+\underbrace{4-5}_{-1}+\cdots+\underbrace{32-33}_{-1}+\underbrace{34-35}_{-1}$$

$$=(-1)+(-1)+\cdots+(-1)+(-1)$$

$$=\left(\frac{34-2}{2}+1\right)\cdot(-1)$$

$$=17\cdot(-1)=-17$$

Yanıt / Answer C

10.

$$\begin{array}{rl} & 5+7+9+\cdots+n=A \\ + & 8+10+12+\cdots+(n-1)=B \\ \hline & 5+7+8+9+10+\cdots+(n-1)+n=A+B \end{array}$$

$$5+7+8+\cdots+n=309$$

$$7+8+\cdots+n=304$$

$$1+2+\cdots+6+7+8+\cdots+n=1+2+\cdots+6+304$$

$$\frac{n(n+1)}{2}=325 \Rightarrow n(n+1)=650 \Rightarrow n=25$$

Yanıt / Answer A

11.

$$\begin{array}{rl} & 1+2+3+\ldots+20+21+22+\ldots+x=A \\ - & 21+22+23+\ldots+x=B \\ \hline & 1+2+3+\cdots+20=A-B \end{array}$$

$$\frac{20\cdot 21}{2}=A-B$$

$$210=A-B$$

$$\begin{array}{rl} & A+B=462 \\ + & A-B=210 \\ \hline & 2A=672 \\ & A=336 \end{array}$$

Yanıt / Answer D

12. $6+14+22+\ldots+118$

$$=\left(\frac{118-6}{8}+1\right)\cdot\left(\frac{118+6}{2}\right)$$

$$=(14+1)\cdot 62$$

$$=15\cdot 62$$

$$=930$$

Yanıt / Answer E

13. $9+11+13+\ldots+(2n-1)=240$

$$1+3+5+7+9+11+13+\ldots+(2n-1)=256$$

$$n^2=256$$

$$n=16$$

Yanıt / Answer C

14.

$$\begin{array}{rl} & A=4+5+6+\cdots+(n-2)+(n-1)+n+(n+1) \\ - & B=1+2+3+4+5+\cdots+(n-2) \\ \hline & A-B=(n-1)+n+(n+1)-1-2-3 \end{array}$$

$$189=3n-6$$

$$195=3n$$

$$n=65$$

Yanıt / Answer B

15. $\dfrac{6+12+18+\cdots+108}{4+8+12+\cdots+72}=\dfrac{2n}{3}$

$$\frac{6(1+2+3+\cdots+18)}{4(1+2+3+\cdots+18)}=\frac{2n}{3}$$

$$\frac{3}{2}=\frac{2n}{3} \Rightarrow n=\frac{9}{4}$$

Yanıt / Answer A

16. $2+4+\cdots+2n=1260$

$$n(n+1)=1260$$

$$n=35$$

Yanıt / Answer A

1. $\dfrac{8!+9!+10!}{8!}=?$

A) 10 B) 27 C) 99 D) 100 E) 101

2. $\dfrac{12!\ -\ 10!}{9!}=?$

A) 910 B) 1210 C) 1310 D) 1320 E) 1340

3. $3!\cdot x+4!\cdot x=7! \Rightarrow x=?$

A) 1 B) 24 C) 120 D) 128 E) 168

4. $\dfrac{(n+1)!}{(n-1)!}=20 \Rightarrow n=?$

A) 4 B) 5 C) 6 D) 8 E) 10

5. $\dfrac{5!+2\cdot 6!+7!}{8!-\ 6!}=?$

A) 1 B) $\frac{1}{3}$ C) $\frac{1}{6}$ D) $\frac{2}{5}$ E) $\frac{3}{8}$

6. $n!+(n+1)!=\dfrac{(n+2)!}{12} \Rightarrow n=?$

A) 10 B) 11 C) 12 D) 13 E) 14

7. $\dfrac{(n-2)!+(n-1)!+n!}{(n-2)!}=64 \Rightarrow n=?$

A) 5 B) 6 C) 7 D) 8 E) 9

8. $\dfrac{9!+8!}{7!+6!}=A \Rightarrow A=?$

A) 55 B) 60 C) 65 D) 70 E) 75

9. $\dfrac{(n-3)!}{(n-5)!}=72 \Rightarrow$ **n = ?**

A) 11 B) 12 C) 13 D) 14 E) 15

10. n, x, A $\in \mathbb{N}^+$,

$80!-60!=x$

$x=A\cdot 10^n$

$\Rightarrow$ **max (n) = ?**

A) 12 B) 14 C) 16 D) 18 E) 20

11. $\dfrac{\mathbf{4\cdot(4!+3!)}}{\mathbf{5!-4!}}=?$

A) $\dfrac{4}{3}$ B) $\dfrac{3}{4}$ C) $\dfrac{4}{5}$ D) $\dfrac{2}{5}$ E) $\dfrac{5}{4}$

12. n, A $\in \mathbb{N}^+$,

$36!=5^n\cdot A \Rightarrow$ **max(n) = ?**

A) 6 B) 7 C) 8 D) 9 E) 10

13. A, x $\in \mathbb{N}^+$,

$42!=A\cdot 6^x \Rightarrow$ **max(x) = ?**

A) 15 B) 16 C) 17 D) 18 E) 19

14. A, n $\in \mathbb{N}^+$,

$38!+39!=A\cdot 10^n \Rightarrow$ **max(n) = ?**

A) 6 B) 7 C) 8 D) 9 E) 10

15. $\dfrac{(n+3)!}{9!}=110 \Rightarrow$ **n = ?**

A) 8 B) 9 C) 10 D) 11 E) 12

16. $\dfrac{(n-3)!}{(n-2)!+(n-1)!}=\dfrac{1}{35} \Rightarrow$ **n = ?**

A) 6 B) 7 C) 8

D) 9 E) 10

[EGE-YÖS 2012]

Yanıtlar / Answers

1. D	**4. A**	**7. D**	**10. B**	**13. E**	**16. B**
2. C	**5. C**	**8. D**	**11. E**	**14. D**	
3. E	**6. B**	**9. B**	**12. C**	**15. A**	

1. $\dfrac{8!+9!+10!}{8!}=\dfrac{8!\,(1+9+10\cdot 9)}{8!}=100$

Yanıt / Answer D

2. $\dfrac{12!-10!}{9!}=\dfrac{9!\cdot(12\cdot 11\cdot 10-10)}{9!}=1310$

Yanıt / Answer C

3. $3!\cdot x+4!\cdot x=7!$

$3!\cdot(x+4x)=7\cdot 6\cdot 5\cdot 4\cdot 3!$

$5x=7\cdot 6\cdot 5\cdot 4$

$x=7\cdot 6\cdot 4$

$x=168$

Yanıt / Answer E

4. $\dfrac{(n+1)!}{(n-1)!}=20 \Rightarrow \dfrac{(n+1)\cdot n\cdot(n-1)!}{(n-1)!}=20$

$(n+1)\cdot n=20$

$n=4$

Yanıt / Answer A

5. $\dfrac{5!+2\cdot 6!+7!}{8!-6!}=\dfrac{5!\cdot(1+2\cdot 6+7\cdot 6)}{6!(8\cdot 7-1)}=\dfrac{5!\cdot 55}{6!\cdot 55}=\dfrac{1}{6}$

Yanıt / Answer C

6. $n!+(n+1)!=\dfrac{(n+2)!}{12}$

$n!\cdot(1+(n+1))=\dfrac{(n+2)\cdot(n+1)\cdot n!}{12}$

$(n+2)=\dfrac{(n+2)\cdot(n+1)}{12}$

$12=n+1$

$n=11$

Yanıt / Answer B

7. $\dfrac{(n-2)!+(n-1)!+n!}{(n-2)!}=64$

$\dfrac{(n-2)!\cdot[1+(n-1)+n(n-1)]}{(n-2)!}=64$

$1+n-1+n^2-n=64$

$n^2=64$

$n=8$

Yanıt / Answer D

8. $\dfrac{9!+8!}{7!+6!}=\dfrac{8!\,(9+1)}{6!\,(7+1)}=\dfrac{8!\cdot 10}{6!\cdot 8}=\dfrac{8\cdot 7\cdot 6!\cdot 10}{6!\cdot 8}=70$

Yanıt / Answer D

9. $$\frac{(n-3)!}{(n-5)!}=72$$

$$\frac{(n-3)\cdot(n-4)\cdot(n-5)!}{(n-5)!}=72$$

$$(n-3)\cdot(n-4)=72$$

$$n-3=9$$

$$n=12$$

Yanıt / Answer B

10. $80!-60!=x$

$80!-60!=A\cdot 10^n$

60 | 5
– 60 | **12** | 5
0 – 10 | **2**
2

$\Rightarrow \max(n)=12+2=14$

Yanıt / Answer B

11. $$\frac{4\cdot(4!+3!)}{5!-4!}=\frac{4\cdot 3!\cdot(4+1)}{4!\cdot(5-1)}=\frac{4!\cdot 5}{4!\cdot 4}=\frac{5}{4}$$

Yanıt / Answer E

12. $36!=5^n\cdot A$

36 | 5
| **7** | 5
| **1**

$\Rightarrow \max(n)=8$

Yanıt / Answer C

13. $42!=A\cdot 6^x$

$42!=A\cdot 3^x\cdot 2^x$

42 | 3
| **14** | 3
| **4** | 3
| **1**

$\Rightarrow \max(x)=14+4+1=19$

Yanıt / Answer E

14. $38!+39!=A\cdot 10^n$

$38!(1+39)=A\cdot 10^n$

$38!\cdot 5^1\cdot 8=A\cdot 5^n\cdot 2^n$

38 | 5
| **7** | 5
| **1**

$\Rightarrow \max(n)=7+1+1=9$

Yanıt / Answer D

15. $$\frac{(n+3)!}{9!}=110$$

$$\frac{(n+3)!}{9!}=11\cdot 10 \Rightarrow (n+3)!=11\cdot 10\cdot 9!$$

$$(n+3)!=11!$$

$$n+3=11$$

$$n=8$$

Yanıt / Answer A

16. $$\frac{(n-3)!}{(n-2)!+(n-1)!}=\frac{(n-3)!}{(n-2)!(1+n-1)}$$

$$=\frac{(n-3)!}{(n-2)!\cdot n}$$

$$=\frac{1}{(n-2)\cdot n}=\frac{1}{35}\Rightarrow n=7$$

Yanıt / Answer B

1. $(121)_3 = (a)_5 \Rightarrow$ **a = ?**

A) 21 B) 28 C) 31 D) 35 E) 36

2. $(125)_6 + 3 = (A)_6 \Rightarrow$ **A = ?**

A) $(121)_6$ B) $(130)_6$ C) $(132)_6$ D) $(134)_6$ E) $(141)_6$

3. $(21)_x = (1011)_2 \Rightarrow$ **x = ?**

A) 3 B) 4 C) 5 D) 6 E) 7

4. $(321)_5 + (423)_5 + (124)_5 = (x)_5 \Rightarrow$ **x = ?**

A) 1423 B) 1433 C) 1434 D) 1440 E) 1443

5. $(x4x)_6 = (y4y)_5 \Rightarrow$ **x + y = ?**

A) 4 B) 5 C) 6 D) 7 E) 8

6. $A = \dfrac{(1101)_2 \cdot (1110)_2}{(111)_2} \Rightarrow \mathbf{(A)_{10} = ?}$

A) 20 B) 22 C) 24 D) 26 E) 28

7. $(a3)_{a+1} = 5a \Rightarrow$ **a = ?**

A) 3 B) 4 C) 5 D) 6 E) 7

8. $(212a)_5 = (562)_7 \Rightarrow$ **a = ?**

A) 0 B) 1 C) 2 D) 3 E) 4

9. $(10a4)_{a+1} < 256 \Rightarrow$ **max(a) = ?**

A) 4 B) 5 C) 6 D) 7 E) 8

10. $\left.\begin{array}{l}(14a)_5 = x \\ (123)_a = y\end{array}\right\} \Rightarrow$ **x + y = ?**

A) 44 B) 51 C) 58 D) 64 E) 76

11. $(1a)_{a+2} = (2b)_a \Rightarrow$ **b = ?**

A) 0 B) 1 C) 2 D) 3 E) 4

12. $(1a5)_{2a} = 59 \Rightarrow$ **a = ?**

A) 3 B) 4 C) 5 D) 6 E) 7

13. $(224)_6^2 - (221)_6^2 = (A)_6 \Rightarrow$ **A = ?**

A) 2222 B) 2223 C) 2322

D) 2323 E) 2333

14. $(x)_9 = 3 \cdot 9^4 + 5 \cdot 9^2 + 57 \Rightarrow$ **x = ?**

A) 3563 B) 30557 C) 30563

D) 3563 E) 3557

15. $(43)_a \cdot 4 = (235)_a \Rightarrow$ **a = ?**

A) 6 B) 7 C) 8 D) 9 E) 10

16. $(23,14)_5 = (x)_{10} \Rightarrow$ **x = ?**

A) $\frac{56}{5}$ B) $\frac{284}{25}$ C) $\frac{287}{25}$

D) $\frac{292}{25}$ E) $\frac{58}{5}$

Yanıtlar / Answers

1. C	4. A	7. A	10. E	13. B	16. B
2. C	5. B	8. E	11. C	14. C	
3. C	6. D	9. B	12. A	15. B	

1. $(121)_3 = (a)_5$

$1\cdot3^0 + 2\cdot3^1 + 1\cdot3^2 = 1 + 6 + 9 = 16$

$$\begin{array}{r|l} 16 & 5 \\ -\,15 & \textcircled{3} \\ \hline \textcircled{1} & \end{array} \Rightarrow (121)_3 = (31)_5 \Rightarrow a = 31$$

Yanıt / Answer C

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2. $(125)_6 + 3 = (A)_6$

$(3)_{10} = (3)_6$

$$\begin{array}{r} (125)_6 \\ \Rightarrow \quad +\ (3)_6 \\ \hline (132)_6 \end{array} \Rightarrow A = 132$$

Yanıt / Answer C

---

3. $(21)_x = (1011)_2$

$1\cdot x^0 + 2\cdot x^1 = 1\cdot2^0 + 1\cdot2^1 + 0\cdot2^2 + 1\cdot2^3$

$1 + 2x = 1 + 2 + 8$

$2x = 10$

$x = 5$

Yanıt / Answer C

---

4. $(321)_5 + (423)_5 + (124)_5 = (x)_5$

$$\begin{array}{r} (321)_5 \\ (423)_5 \\ +\ (124)_5 \\ \hline (1423)_5 \end{array} \Rightarrow x = 1423$$

$$\begin{array}{r|l} 8 & 5 \\ -\,5 & 1 \\ \hline \textcircled{3} & \end{array} \quad \begin{array}{r|l} 7 & 5 \\ -\,5 & 1 \\ \hline \textcircled{2} & \end{array} \quad \begin{array}{r|l} 9 & 5 \\ 5 & 1 \\ \hline \textcircled{4} & \end{array}$$

Yanıt / Answer A

---

5. $(x4x)_6 = (y4y)_5$

$x\cdot6^0 + 4\cdot6^1 + x\cdot6^2 = y\cdot5^0 + 4\cdot5^1 + y\cdot5^2$

$x + 24 + 36x = y + 20 + 25y$

$37x + 4 = 26y$

$x < 6,\ y < 5 \Rightarrow x = 2,\ y = 3 \Rightarrow x + y = 5$

Yanıt / Answer B

---

6. $A = \dfrac{(1101)_2 \cdot (1110)_2}{(111)_2}$

$= \dfrac{(1\cdot2^0 + 0\cdot2^1 + 1\cdot2^2 + 1\cdot2^3)\cdot(0\cdot2^0 + 1\cdot2^1 + 1\cdot2^2 + 1\cdot2^3)}{1\cdot2^0 + 1\cdot2^1 + 1\cdot2^2}$

$= \dfrac{13\cdot14}{7} = 26$

Yanıt / Answer D

---

7. $(a3)_{a+1} = 5a$

$3\cdot(a+1)^0 + a(a+1)^1 = 5a$

$3 + a^2 + a = 5a$

$a^2 - 4a + 3 = 0$

$(a-3)\cdot(a-1) = 0, \quad [\,a + 1 > 3 \Rightarrow a > 2\,]$

$a = 3$

Yanıt / Answer A

---

8. $(212a)_5 = (562)_7$

$a\cdot5^0 + 2\cdot5^1 + 1\cdot5^2 + 2\cdot5^3 = 2\cdot7^0 + 6\cdot7^1 + 5\cdot7^2$

$a + 10 + 25 + 250 = 2 + 42 + 245$

$a = 4$

Yanıt / Answer E

9. $(10a4)_{a+1} < 256$

$4\cdot(a+1)^0 + a(a+1)^1 + 0(a+1)^2 + 1(a+1)^3 < 256$

$4 + a(a+1) + (a+1)^3 < 256$

$a(a+1) + (a+1)^3 < 252$

$(a+1)(a+(a+1)^2) < 252$

$a+1 > 4 \;\Rightarrow\; a > 3 \;\Rightarrow\; \max(a) = 5$

Yanıt / Answer B

10. $\left.\begin{aligned}(14a)_5 &= x\\ (123)_a &= y\end{aligned}\right\} \Rightarrow 3 < a < 5 \Rightarrow a = 4$

$\Rightarrow x = (144)_5\,,\; y = (123)_4$

$x + y = 4\cdot5^0 + 4\cdot5^1 + 1\cdot5^2 + 3\cdot4^0 + 2\cdot4^1 + 1\cdot4^2$

$= 4 + 20 + 25 + 3 + 8 + 16$

$= 76$

Yanıt / Answer E

11. $(1a)_{a+2} = (2b)_a$

$a(a+2)^0 + 1\cdot(a+2)^1 = b\cdot a^0 + 2\cdot a^1$

$a + a + 2 = b + 2a$

$b = 2$

Yanıt / Answer C

12. $(1a5)_{2a} = 59$

$5\cdot(2a)^0 + a\cdot(2a)^1 + 1\cdot(2a)^2 = 59$

$5 + 2a^2 + 4a^2 = 59$

$6a^2 = 54$

$a^2 = 9$

$a = 3$

Yanıt / Answer A

13. $(224)_6^2 - (221)_6^2 = (A)_6$

$[(224)_6 + (221)_6] \cdot [(224_6 - (221)_6] = (A)_6$

$(445)_6\cdot(3)_6 = (A)_6$

$(2223)_6 = (A)_6$

$\Rightarrow A = 2223$

$$\begin{array}{r} (224)_6\\ +\;(221)_6\\ \hline (445)_6 \end{array} \qquad \begin{array}{r} (224)_6\\ -\;(221)_6\\ \hline (3)_6 \end{array} \qquad \begin{array}{r} (445)_6\\ \times\;(3)_6\\ \hline 2223 \end{array}$$

Yanıt / Answer B

14. $(x)_9 = 3\cdot9^4 + 5\cdot9^2 + 57$

$= 3\cdot9^4 + 0\cdot9^3 + 5\cdot9^2 + 6\cdot9^1 + 3$

$= (30563)_9$

$\Rightarrow x = 30563$

Yanıt / Answer C

15. $(43)_a\cdot 4 = (235)_a$

$(3\cdot a^0 + 4\cdot a^1)\cdot 4 = (5\cdot a^0 + 3\cdot a^1 + 2\cdot a^2)$

$12 + 16a = 5 + 3a + 2a^2$

$2a^2 - 13a - 7 = 0$

$$\begin{array}{ll} \downarrow & \downarrow\\ a & -7\\ +2 & +1 \end{array}$$

$(a-7)\cdot(2a+1) = 0$

$a = 7$

Yanıt / Answer B

16. $(23{,}14)_5 = (x)_{10}$

$x = 3\cdot5^0 + 2\cdot5^1 + 1\cdot5^{-1} + 4\cdot5^{-2}$

$= 3 + 10 + \dfrac{1}{5} + \dfrac{4}{25}$

$= \dfrac{284}{25}$

Yanıt / Answer B

1. $A + B = C$

$C - A = D \Rightarrow$ **$B = ?$**

A) 2A B) A – C C) $\frac{A+D}{2}$

D) $\frac{A-D}{2}$ E) D

2. $ABC4 - 5BC7 = 1997 \Rightarrow$ **$A = ?$**

A) 4 B) 5 C) 6 D) 7 E) 8

3. $5 \cdot A + 2 \cdot B = BA \Rightarrow$ **$\min(AB) = ?$**

A) 11 B) 12 C) 21 D) 24 E) 42

4. $AB = 4A + 3B \Rightarrow$ **$\max(B - A) = ?$**

A) 4 B) 5 C) 6 D) 7 E) 8

5. $ABC + AB = 412 \Rightarrow$ **$A \cdot B \cdot C = ?$**

A) 105 B) 108 C) 112 D) 116 E) 120

6. $A \cdot B = 28$

$B \cdot C = 56 \Rightarrow$ **$\min(A + B + C) = ?$**

A) 13 B) 15 C) 16 D) 18 E) 19

7.

$$\begin{array}{r|l} 2A+5 & 28 \\ \cline{2-2} - & 2x+1 \\ \hline x^3 & \end{array} \Rightarrow \max(A) = ?$$

A) 100 B) 109 C) 114 D) 117 E) 129

8. $A, B \in N^+$

$\frac{A+3}{5} + B = 8 \Rightarrow$ **$\max(A) = ?$**

A) 25 B) 28 C) 30 D) 32 E) 35

9. $\begin{array}{r|l} A & B \\ \cline{2-2} \underline{} & 4 \\ 3 & \end{array} \qquad \begin{array}{r|l} C & B \\ \cline{2-2} \underline{} & 5 \\ 4 & \end{array} \quad \Rightarrow \mathbf{C = ?}$

A) $\frac{5A-1}{4}$ B) $\frac{5A+1}{4}$ C) $\frac{5A-1}{2}$

D) $\frac{5A+1}{2}$ E) $5A+1$

10. $8 + 10 + 12 + \ldots + 2n = 98 \Rightarrow \mathbf{n = ?}$

A) 8 B) 9 C) 10 D) 11 E) 12

11. $\frac{24 \cdot 25! - 25!}{23 \cdot 24!} = ?$

A) 23 B) 24 C) 25 D) 26 E) 27

12. $\frac{(n+2)!}{n! + (n-1)!} = 80 \Rightarrow \mathbf{n = ?}$

A) 8 B) 10 C) 12 D) 14 E) 16

13. $A, m \in N^+$,

$53! + 42! = A \cdot 10^m$

$\Rightarrow \sum \mathbf{m = ?}$

A) 9 B) 45 C) 48 D) 72 E) 108

14. $\frac{(n+3)!}{90(n+1)\cdot(n-1)!} = 1 \Rightarrow \mathbf{n = ?}$

A) 3 B) 5 C) 6 D) 9 E) 10

15. $(2aa)_{a+1} = 74 \Rightarrow \mathbf{x = ?}$

A) 1 B) 2 C) 3 D) 4 E) 5

16. $(4a3)_5 = (bb1)_7 \Rightarrow \mathbf{b = ?}$

A) 0 B) 1 C) 2 D) 3 E) 4

Yanıtlar / Answers

1. E	4. C	7. B	10. C	13. B	16. C
2. D	5. A	8. D	11. C	14. A	
3. C	6. E	9. B	12. A	15. D	

1.

$$\begin{array}{r} A+B=C \\ \underline{+\ \ C-A=D} \\ A+B+C-A=C+D \\ B=D \end{array}$$

Yanıt / Answer E

2. ABC4 – 5BC7 = 1997

1000A + 100B +10C + 4–5000–100B – 10C – 7 = 1997

$1000 \cdot A = 7000$

$A = 7$

Yanıt / Answer D

3. $5 \cdot A + 2 \cdot B = BA$

$5 \cdot A + 2 \cdot B = 10B + A$

$4A = 8B$

$A = 2B$

$B = 1 \Rightarrow A = 2$

$\Rightarrow \min(AB) = 21$

Yanıt / Answer C

4. $AB = 4A + 3B$

$10A + B = 4A + 3B$

$6A = 2B$

$3A = B$

$\max(B - A) = 9 - 3 = 6$

Yanıt / Answer C

5. ABC + AB = 412

100A + 10B + C + 10A + B = 412

110A + 11B + C = 412

A = 3 , B = 7, C = 5

$A \cdot B \cdot C = 3 \cdot 7 \cdot 5 = 105$

Yanıt / Answer A

6. $A \cdot B = 28$

$B \cdot C = 56$

B = 7, A = 4, C = 8

min(A + B + C) = 7 + 4 + 8 = 19

Yanıt / Answer E

7.

$$\begin{array}{r|l} 2A+5 & 28 \\ \cline{2-2} - & 2x+1 \\ \cline{1-1} x^3 & \end{array} \qquad \begin{array}{l} x^3 < 28 \\ \Rightarrow \max(x) = 3 \end{array}$$

$2A + 5 = 28(2x + 1) + x^3$

$2A + 5 = 28(2 \cdot 3 + 1) + 3^3$

$2A + 5 = 223$

$2A = 218$

$\Rightarrow \max(A) = 109$

Yanıt / Answer B

8. $\dfrac{A+3}{5} + B = 8$

$A + 3 + 5B = 40$

$A = 37 - 5B$

$B = 1 \Rightarrow \max(A) = 32$

Yanıt / Answer D

9.

$$\begin{array}{r|l} A & B \\ \cline{2-2} \underline{-\quad} & 4 \\ 3 & \end{array} \qquad\qquad \begin{array}{r|l} C & B \\ \cline{2-2} \underline{-\quad} & 5 \\ 4 & \end{array}$$

$$A = 4B + 3$$

$$A - 3 = 4B$$

$$\frac{A-3}{4} = B$$

$$C = 5B + 4$$

$$= 5 \cdot \left(\frac{A-3}{4}\right) + 4$$

$$= \frac{5A-15}{4} + 4$$

$$= \frac{5A+1}{4}$$

Yanıt / Answer B

10. $8 + 10 + 12 + \ldots + 2n = 98$

$$2 + 4 + 6 + 8 + \ldots + 2n = 2 + 4 + 6 + 98$$

$$2 + 4 + \ldots + 2n = 110$$

$$n(n + 1) = 110$$

$$n = 10$$

Yanıt / Answer C

11. $$\frac{24 \cdot 25! - 25!}{23 \cdot 24!} = \frac{25! \cdot (24-1)}{23 \cdot 24!} = \frac{25 \cdot 24!}{24!} = 25$$

Yanıt / Answer C

12. $$\frac{(n+2)!}{n! + (n-1)!} = 80$$

$$\frac{(n+2)\cdot(n+1)\cdot n(n-1)!}{n\cdot(n-1)! + (n-1)!} = 80$$

$$\frac{(n+2)\cdot(n+1)\cdot n(n-1)!}{(n-1)!\cdot(n+1)} = 80$$

$$n\cdot(n+2) = 80 = 8 \cdot 10 \Rightarrow n = 8$$

Yanıt / Answer A

13. $53! + 42! = A \cdot 10^m$

$$\begin{array}{r|c|l} 42 & 5 & \\ \cline{2-2} \underline{-40} & \textcircled{8} & 5 \\ \cline{3-3} 2 & \underline{-5} & \textcircled{1} \\ & 3 & \end{array}$$

$$\max(m) = 8 + 1 = 9$$

$$\Rightarrow m = 1, 2, 3, \ldots, 9$$

$$\sum m = 1 + 2 + 3 + \cdots + 9$$

$$= \frac{9 \cdot 10}{2} = 45$$

Yanıt / Answer B

14. $$\frac{(n+3)!}{90(n+1)\cdot(n-1)!} = 1$$

$$\frac{(n+3)\cdot(n+2)\cdot(n+1)\cdot n(n-1)!}{90(n+1)\cdot(n-1)!} = 1$$

$$(n+3)\cdot(n+2)\cdot n = 90 = 6 \cdot 5 \cdot 3$$

$$n + 3 = 6 \Rightarrow n = 3$$

Yanıt / Answer A

15. $(2aa)_{a+1} = 74$

$$a(a + 1)^0 + a(a + 1)^1 + 2(a + 1)^2 = 74$$

$$a + a^2 + a + 2(a^2 + 2a + 1) = 74$$

$$3a^2 + 6a - 72 = 0$$

$$a^2 + 2a - 24 = 0$$

$$(a + 6)\cdot(a - 4) = 0$$

$$a = 4$$

Yanıt / Answer D

16. $(4a3)_5 = (bb1)_7$

$$3 \cdot 5^0 + a \cdot 5^1 + 4 \cdot 5^2 = 1 \cdot 7^0 + b \cdot 7^1 + b \cdot 7^2$$

$$3 + 5a + 100 = 1 + 7b + 49b$$

$$5a + 102 = 56b$$

$$a = 2, \; b = 2$$

Yanıt / Answer C

RASYONEL ve ONDALIK SAYILAR
RATIONAL and DECIMAL NUMBERS

BÖLÜM
CHAPTER
2

Rasyonel Sayılar / Rational Numbers

Test 1

1. $\frac{1}{2}-\frac{3}{4}:\frac{3}{2}-\frac{1}{4}=?$

A) $-\frac{1}{5}$ B) $-\frac{1}{4}$ C) $\frac{1}{4}$ D) $\frac{1}{2}$ E) 2

2. $1\frac{1}{2}\cdot\frac{1}{3}-\frac{3}{4}:\frac{6}{8}+\frac{1}{2}=?$

A) $\frac{1}{12}$ B) $\frac{1}{6}$ C) 0 D) $\frac{2}{3}$ E) $\frac{3}{4}$

3. $\frac{1}{3}-\left(\frac{1}{3}+\frac{1}{2}\right)+\frac{2}{3}:\frac{1}{3}=?$

A) $\frac{1}{2}$ B) 1 C) $\frac{3}{2}$ D) 2 E) $\frac{5}{2}$

4. $\frac{1}{4}-\left(\frac{1}{2}+\frac{1}{4}\right)+\left(\frac{1}{2}-\frac{1}{3}\right)+\frac{1}{3}=?$

A) $-\frac{3}{2}$ B) -1 C) $-\frac{1}{2}$ D) 0 E) 1

5. $\frac{2}{3}:\left[\left(\frac{4}{5}:\frac{2}{3}\right)\cdot\frac{1}{2}-\frac{1}{3}\right]=?$

A) $\frac{1}{3}$ B) $\frac{2}{3}$ C) $\frac{4}{3}$ D) $\frac{5}{3}$ E) $\frac{5}{2}$

6. $\dfrac{2}{\frac{3}{4}}-\dfrac{\frac{2}{3}}{4}=?$

A) $\frac{5}{2}$ B) 2 C) $\frac{3}{2}$ D) 1 E) $\frac{1}{2}$

7. $\dfrac{\frac{1}{2}+\frac{1}{3}-\frac{1}{6}}{\frac{4}{6}-\frac{1}{2}+\frac{1}{3}}+\dfrac{\frac{3}{2}-\frac{5}{6}-\frac{1}{3}}{\frac{4}{6}+\frac{1}{3}-\frac{1}{2}}=?$

A) 1 B) $\frac{3}{2}$ C) 2 D) $\frac{5}{2}$ E) 3

8. $\dfrac{\frac{1}{3}+\frac{1}{2}-2}{2+\frac{1}{2}-\frac{1}{6}}+\frac{1}{2}=?$

A) -1 B) 0 C) 1 D) 2 E) 3

9. $\left(\frac{1}{4}-1\right)\cdot\left(\frac{1}{5}-1\right)\cdot\left(\frac{1}{6}-1\right)\ldots\left(\frac{1}{30}-1\right)=?$

A) $-\frac{1}{30}$ B) $-\frac{1}{10}$ C) $-\frac{3}{29}$ D) $\frac{1}{30}$ E) $\frac{1}{10}$

10. $\dfrac{\left(4-\frac{1}{4}\right)-\left(3-\frac{3}{4}\right)}{\left(6-\frac{1}{3}\right)+\left(\frac{4}{3}-5\right)}=?$

A) 3 B) 2 C) 1 D) $\frac{3}{4}$ E) $\frac{1}{2}$

11. $2:\dfrac{1-\frac{1}{3}}{1\frac{1}{2}+\frac{1}{6}}=?$

A) $\frac{3}{5}$ B) $\frac{3}{2}$ C) 2 D) $\frac{5}{3}$ E) 5

12. $3\cdot\left[\left(1-\dfrac{2}{1+\frac{1}{2}}\right)\cdot(-2)\right]=?$

A) −2 B) −1 C) 0 D) 1 E) 2

13. $-\frac{1}{25}:\left[\frac{1}{5}+\frac{2}{15}:\frac{2}{9}\right]=?$

A) $-\frac{1}{5}$ B) $-\frac{2}{5}$ C) $-\frac{1}{10}$ D) $-\frac{1}{20}$ E) $-\frac{2}{25}$

14. $\dfrac{3}{\frac{1}{2}+1}-\left(1-\frac{2}{3}\right)^{-1}=?$

A) $-\frac{7}{2}$ B) $-\frac{5}{2}$ C) −1 D) $\frac{5}{2}$ E) $\frac{3}{2}$

15. $\dfrac{\frac{a}{b}}{c}:\dfrac{\frac{c}{b}}{a}=?$

A) c B) c^2 C) b D) a^2 E) b^2

16. $a+b=64$

$a\cdot b=-16$

$\Rightarrow\left(-\frac{1}{a}-\frac{1}{b}\right)^{-1}=?$

A) $\frac{1}{4}$ B) $\frac{1}{8}$ C) $\frac{1}{12}$ D) $\frac{1}{16}$ E) $\frac{1}{48}$

Yanıtlar / *Answers*

1. B	4. D	7. C	10. D	13.D	16.A
2. C	5. E	8. B	11. E	14.C	
3. C	6. A	9. B	12. E	15.D	

1. $$\frac{1}{2}-\frac{3}{4}:\frac{3}{2}-\frac{1}{4}$$
$$=\frac{1}{2}-\frac{3}{4}\cdot\frac{2}{3}-\frac{1}{4}$$
$$=\frac{1}{2}-\frac{1}{2}-\frac{1}{4}=-\frac{1}{4}$$

Yanıt / Answer B

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2. $$1\frac{1}{2}\cdot\frac{1}{3}-\frac{3}{4}:\frac{6}{8}+\frac{1}{2}$$
$$=\frac{3}{2}\cdot\frac{1}{3}-\frac{3}{4}\cdot\frac{8}{6}+\frac{1}{2}$$
$$=\frac{1}{2}-1+\frac{1}{2}=0$$

Yanıt / Answer C

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3. $$\frac{1}{3}-\left(\frac{1}{3}+\frac{1}{2}\right)+\frac{2}{3}:\frac{1}{3}$$
$$=\frac{1}{3}-\frac{1}{3}-\frac{1}{2}+\frac{2}{3}\cdot 3$$
$$=-\frac{1}{\underset{(1)}{2}}+\frac{2}{\underset{(2)}{1}}=-\frac{1}{2}+\frac{4}{2}=\frac{3}{2}$$

Yanıt / Answer C

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4. $$\frac{1}{4}-\left(\frac{1}{2}+\frac{1}{4}\right)+\left(\frac{1}{2}-\frac{1}{3}\right)+\frac{1}{3}$$
$$=\frac{1}{4}-\frac{1}{2}-\frac{1}{4}+\frac{1}{2}-\frac{1}{3}+\frac{1}{3}=0$$

Yanıt / Answer D

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5. $$\frac{2}{3}:\left[\left(\frac{4}{5}:\frac{2}{3}\right)\cdot\frac{1}{2}-\frac{1}{3}\right]$$
$$=\frac{2}{3}:\left[\left(\frac{4}{5}\cdot\frac{3}{2}\cdot\frac{1}{2}\right)-\frac{1}{3}\right]$$
$$=\frac{2}{3}:\left(\frac{3}{\underset{(3)}{5}}-\frac{1}{\underset{(5)}{3}}\right)=\frac{2}{3}:\left(\frac{9}{15}-\frac{5}{15}\right)$$
$$=\frac{2}{3}:\frac{4}{15}=\frac{2}{3}\cdot\frac{15}{4}=\frac{5}{2}$$

Yanıt / Answer E

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6. $$\frac{\frac{2}{3}}{\frac{3}{4}}-\frac{\frac{2}{3}}{4}=2\cdot\frac{4}{3}-\frac{2}{3}\cdot\frac{1}{4}$$
$$=\frac{8}{\underset{(2)}{3}}-\frac{1}{\underset{(1)}{6}}=\frac{16}{6}-\frac{1}{6}=\frac{15}{6}=\frac{5}{2}$$

Yanıt / Answer A

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7. $$\frac{\frac{1}{2}+\frac{1}{3}-\frac{1}{6}}{\frac{4}{6}-\frac{1}{2}+\frac{1}{3}}+\frac{\frac{3}{2}-\frac{5}{6}-\frac{1}{3}}{\frac{4}{6}+\frac{1}{3}-\frac{1}{2}}$$
$$=\frac{\frac{1}{2}+\frac{1}{3}-\frac{1}{6}+\frac{3}{2}-\frac{5}{6}-\frac{1}{3}}{\frac{4}{6}-\frac{1}{2}+\frac{1}{3}}=\frac{2-1}{\frac{2}{3}-\frac{1}{2}+\frac{1}{3}}=\frac{1}{1-\frac{1}{2}}=\frac{1}{\frac{1}{2}}=2$$

Yanıt / Answer C

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8. $$\frac{\frac{1}{\underset{(2)}{3}}+\frac{1}{\underset{(3)}{2}}-\frac{2}{\underset{(6)}{1}}}{\frac{2}{\underset{(6)}{1}}+\frac{1}{\underset{(3)}{2}}-\frac{1}{\underset{(1)}{6}}}+\frac{1}{2}=\frac{\frac{2+3-12}{6}}{\frac{12+3-1}{6}}+\frac{1}{2}=\frac{-7}{14}+\frac{1}{2}=0$$

Yanıt / Answer B

9. $$\left(\frac{1}{4}-1\right)\cdot\left(\frac{1}{5}-1\right)\cdot\left(\frac{1}{6}-1\right)\ldots\ldots\left(\frac{1}{29}-1\right)\cdot\left(\frac{1}{30}-1\right)$$

$$=\left(-\frac{3}{4}\right)\cdot\left(-\frac{4}{5}\right)\cdot\left(-\frac{5}{6}\right)\ldots\ldots\left(-\frac{28}{29}\right)\cdot\left(-\frac{29}{30}\right)$$

$$=-\frac{3}{30}=-\frac{1}{10}$$

Yanıt / Answer B

10. $$\frac{\left(4-\frac{1}{4}\right)-\left(3-\frac{3}{4}\right)}{\left(6-\frac{1}{3}\right)+\left(\frac{4}{3}-5\right)}=\frac{4-\frac{1}{4}-3+\frac{3}{4}}{6-\frac{1}{3}+\frac{4}{3}-5}$$

$$=\frac{1+\frac{2}{4}}{1+1}=\frac{\frac{3}{2}}{2}=\frac{3}{4}$$

Yanıt / Answer D

11. $$2:\frac{\underset{(3)}{\frac{1}{1}}-\frac{1}{3}}{1\frac{1}{2}+\frac{1}{6}}=2:\frac{\frac{3}{3}-\frac{1}{3}}{\underset{(3)}{\frac{3}{2}}+\underset{(1)}{\frac{1}{6}}}=2:\frac{\frac{2}{3}}{\frac{9}{6}+\frac{1}{6}}$$

$$=2:\frac{\frac{2}{3}}{\frac{10}{6}}=2:\left(\frac{2}{3}\cdot\frac{6}{10}\right)$$

$$=2:\frac{2}{5}=2\cdot\frac{5}{2}=5$$

Yanıt / Answer E

12. $$3\cdot\left[\left(1-\frac{2}{\underset{(2)}{\frac{1}{1}}+\underset{(1)}{\frac{1}{2}}}\right)\cdot(-2)\right]=3\cdot\left[\left(1-\frac{2}{\frac{2}{2}+\frac{1}{2}}\right)\cdot(-2)\right]$$

$$=3\cdot\left[\left(1-\frac{2}{\frac{3}{2}}\right)\cdot(-2)\right]=3\cdot\left[\left(1-2\cdot\frac{2}{3}\right)\cdot(-2)\right]$$

$$=3\cdot\left[\left(1-\frac{4}{3}\right)\cdot(-2)\right]=3\left(-\frac{1}{3}\cdot(-2)\right)=3\cdot\frac{2}{3}=2$$

Yanıt / Answer E

13. $$-\frac{1}{25}:\left(\frac{1}{5}+\frac{2}{15}:\frac{2}{9}\right)=-\frac{1}{25}:\left(\frac{1}{5}+\frac{2}{15}\cdot\frac{9}{2}\right)$$

$$=-\frac{1}{25}:\left(\frac{1}{5}+\frac{3}{5}\right)=-\frac{1}{25}\cdot\frac{5}{4}=-\frac{1}{20}$$

Yanıt / Answer D

14. $$\frac{3}{\frac{1}{2}+1}-\left(1-\frac{2}{3}\right)^{-1}=\frac{3}{\frac{3}{2}}-\left(\frac{1}{3}\right)^{-1}=3\cdot\frac{2}{3}-3=2-3=-1$$

Yanıt / Answer C

15. $$\frac{a}{\frac{b}{c}}:\frac{\frac{c}{b}}{a}=a\cdot\frac{c}{b}:\left(\frac{c}{b}\cdot\frac{1}{a}\right)$$

$$=\frac{a\cdot c}{b}:\frac{c}{b\cdot a}=\frac{a\cdot c}{b}\cdot\frac{b\cdot a}{c}=a^2$$

Yanıt / Answer D

16. $a+b=64$

$a\cdot b=-16$

$$\left(-\underset{(b)}{\frac{1}{a}}-\underset{(a)}{\frac{1}{b}}\right)^{-1}=\left(\frac{-b-a}{ab}\right)^{-1}=\frac{a\cdot b}{-(a+b)}=\frac{-16}{-64}=\frac{1}{4}$$

Yanıt / Answer A

1. $2-\left[\frac{4}{3}:\left(1-\frac{1}{3}\right)-\frac{3}{4}\cdot\frac{2}{9}\right]=?$

A) $\frac{1}{2}$ B) $\frac{2}{3}$ C) $\frac{3}{4}$ D) $\frac{4}{5}$ E) $\frac{1}{6}$

2. $\left(\frac{1-\frac{2}{5}}{1+\frac{2}{5}}\right):\left(1-\frac{1}{-1+\frac{1}{4}}\right)=?$

A) $-\frac{9}{7}$ B) $-\frac{3}{4}$ C) $\frac{3}{7}$ D) $\frac{9}{28}$ E) $\frac{9}{49}$

3. $1-\frac{1}{1-\frac{1}{1-\frac{1}{1-\frac{1}{2}}}}=?$

A) 2 B) $\frac{3}{2}$ C) 1 D) $\frac{1}{2}$ E) 0

4. $\frac{13}{3-\frac{1}{3-\frac{1}{x}}}=5 \Rightarrow x=?$

A) –2 B) –1 C) 0 D) 1 E) 2

5. $6-\frac{2}{3+\frac{1}{2-\frac{1}{4-\frac{2}{x}}}}=5 \Rightarrow x=?$

A) $\frac{2}{3}$ B) $\frac{4}{5}$ C) $\frac{5}{9}$ D) $\frac{7}{8}$ E) $\frac{6}{11}$

6. $1+\frac{6}{1+\frac{6}{1+\frac{6}{\vdots}}}=?$

A) 1 B) 2 C) 3 D) 4 E) 5

7. $\frac{\left(\frac{2}{3}-1\right)^{-1}:2}{3-1:\left(2-\frac{1}{3}\right)^{-1}}=?$

A) $-\frac{9}{8}$ B) –1 C) $\frac{4}{9}$ D) $\frac{9}{8}$ E) $\frac{4}{3}$

8. $\frac{1}{\frac{1}{x}-1}+\frac{1}{1-\frac{1}{x}}=?$

A) –x B) –1 C) 0 D) 1 E) x

9. $2+\cfrac{3}{2+\cfrac{3}{2+\cfrac{3}{\vdots}}}=\dfrac{2}{3+x} \Rightarrow x=?$

A) -7 B) $-\frac{7}{3}$ C) $-\frac{10}{3}$ D) $\frac{3}{7}$ E) 7

10. $2-\cfrac{3+\cfrac{2}{1-\cfrac{1}{3}}}{1+\cfrac{1}{2}}=?$

A) -4 B) -3 C) -2 D) 2 E) 3

11. $\left(1-\frac{1}{4}\right)\cdot\left(1-\frac{1}{5}\right)\cdot\left(1-\frac{1}{6}\right)\dots\left(1-\frac{1}{36}\right)=?$

A) $\frac{1}{36}$ B) $\frac{1}{24}$ C) $\frac{1}{16}$ D) $\frac{1}{12}$ E) $\frac{1}{8}$

12. $1+\cfrac{1}{2-\cfrac{1}{2-\cfrac{1}{x}}}=2 \Rightarrow x=?$

A) -2 B) -1 C) 0 D) 1 E) 2

13. $A=\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{1}{5}$

$B=\frac{1}{2}+\frac{2}{3}+\frac{3}{4}+\frac{4}{5}$

$\Rightarrow$ **A = ?**

A) 4 − B B) B − 4 C) 4 + B

D) B + 4 E) B + 2

14. $\left(-2\frac{1}{2}\right)^{-2}\cdot\left(2\frac{1}{12}\right)^{-1}\cdot\left(\frac{5^{-2}}{6^{-1}}\right)^{-2}=?$

A) $-\frac{3}{4}$ B) $-\frac{4}{3}$ C) $\frac{3}{2}$ D) $\frac{4}{3}$ E) $\frac{3}{4}$

15. $\cfrac{\cfrac{\frac{2}{3}-1}{1-\frac{2}{3}}}{2}:\left(1\frac{1}{2}-2\right)=?$

A) $-\frac{1}{2}$ B) $-\frac{1}{4}$ C) $\frac{1}{2}$ D) $\frac{1}{4}$ E) 1

16. $\dfrac{2007\frac{3}{5}-2008\frac{2}{5}}{1-2\frac{1}{5}}=?$

A) $-\frac{3}{4}$ B) $-\frac{2}{3}$ C) 1 D) $\frac{2}{3}$ E) $\frac{3}{4}$

Yanıtlar / *Answers*

1. E	4. E	7. A	10. C	13. A	16. D
2. E	5. E	8. C	11. D	14. D	
3. D	6. C	9. B	12. D	15. E	

1.

$$2-\left[\frac{4}{3}:\left(\frac{1}{\underset{(3)}{1}}-\frac{1}{\underset{(1)}{3}}\right)-\frac{3}{4}\cdot\frac{2}{9}\right]$$

$$=2-\left[\frac{4}{3}:\left(\frac{3}{3}-\frac{1}{3}\right)-\frac{1}{6}\right]$$

$$=2-\left(\frac{4}{3}:\frac{2}{3}-\frac{1}{6}\right)=2-\left(\frac{4}{3}\cdot\frac{3}{2}-\frac{1}{6}\right)=2-\frac{11}{6}=\frac{1}{6}$$

Yanıt / Answer E

2.

$$\frac{1-\frac{2}{5}}{1+\frac{2}{5}}:\left(1-\frac{1}{-1+\frac{1}{4}}\right)$$

$$=\frac{\frac{3}{5}}{\frac{7}{5}}:\left(1-\frac{1}{-\frac{3}{4}}\right)=\frac{3}{5}\cdot\frac{5}{7}:\left(1-\left(-\frac{4}{3}\right)\right)$$

$$=\frac{3}{7}:\left(1+\frac{4}{3}\right)=\frac{3}{7}:\left(\frac{7}{3}\right)=\frac{3}{7}\cdot\frac{3}{7}=\frac{9}{49}$$

Yanıt / Answer E

3.

$$1-\cfrac{1}{1-\cfrac{1}{1-\cfrac{1}{1-\cfrac{1}{2}}}}=1-\cfrac{1}{1-\cfrac{1}{1-\cfrac{1}{\frac{1}{2}}}}$$

$$=1-\cfrac{1}{1-\cfrac{1}{1-2}}=1-\cfrac{1}{1-\cfrac{1}{(-1)}}$$

$$=1-\frac{1}{1+1}=1-\frac{1}{2}=\frac{1}{2}$$

Yanıt / Answer D

4.

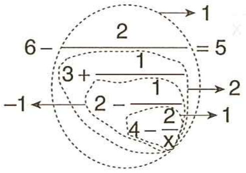
$$\cfrac{13}{3-\cfrac{1}{3-\cfrac{1}{x}}}=5\Rightarrow\frac{13}{5}=3-\cfrac{1}{3-\cfrac{1}{x}}$$

$$\Rightarrow\cfrac{1}{3-\cfrac{1}{x}}=3-\frac{13}{5}\Rightarrow\cfrac{1}{3-\cfrac{1}{x}}=\frac{2}{5}$$

$$\Rightarrow 3-\frac{1}{x}=\frac{5}{2}\Rightarrow 3-\frac{5}{2}=\frac{1}{x}\Rightarrow\frac{1}{2}=\frac{1}{x}\Rightarrow x=2$$

Yanıt / Answer E

5.



$$6-\cfrac{2}{3+\cfrac{1}{2-\cfrac{1}{4-\cfrac{2}{x}}}}=5$$

$$4-\frac{2}{x}=\frac{1}{3}$$

$$\frac{2}{x}=\frac{11}{3}\Rightarrow x=\frac{6}{11}$$

Yanıt / Answer E

6.

$$1+\cfrac{6}{1+\cfrac{6}{1+\cfrac{6}{\vdots}}}\Rightarrow 1+\cfrac{6}{1+\cfrac{6}{\vdots}}=x\Rightarrow 1+\frac{6}{x}=x$$

$$1+\cfrac{6}{1+\cfrac{6}{\vdots}}=x$$

$$\Rightarrow x+6=x^2\Rightarrow x^2-x-6=0$$

$$\begin{array}{cc}\downarrow & \downarrow\\ x & -3\\ x & +2\end{array}$$

$$\Rightarrow (x-3)(x+2)=0\Rightarrow x=3$$

Yanıt / Answer C

7.

$$\frac{\left(\frac{2}{3}-1\right)^{-1}:2}{3-1:\left(2-\frac{1}{3}\right)^{-1}}=\frac{\left(-\frac{1}{3}\right)^{-1}:2}{3-1:\left(\frac{5}{3}\right)^{-1}}$$

$$=\frac{(-3)\cdot\frac{1}{2}}{3-1\cdot\frac{5}{3}}$$

$$=\frac{-\frac{3}{2}}{3-\frac{5}{3}}=\frac{-\frac{3}{2}}{\frac{4}{3}}=-\frac{3}{2}\cdot\frac{3}{4}=-\frac{9}{8}$$

Yanıt / Answer A

8.

$$\frac{1}{\frac{1}{x}-1}+\frac{1}{1-\frac{1}{x}}=\frac{1}{\frac{1-x}{x}}+\frac{1}{\frac{x-1}{x}}$$

$$=\frac{x}{1-x}+\frac{x}{x-1}=\frac{x}{1-x}-\frac{x}{1-x}=0$$

Yanıt / Answer C

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9. $$2+\cfrac{3}{\underbrace{2+\cfrac{3}{2+\cfrac{3}{\vdots}}}_{\longrightarrow \frac{2}{3+x}}}=\frac{2}{3+x}$$

$$2+\cfrac{3}{\cfrac{2}{3+x}}=\frac{2}{3+x}$$

$$\frac{4+9+3x}{2}=\frac{2}{3+x} \quad \Rightarrow$$

$$3x^2+22x+39=4$$

$$3x^2+22x+35=0 \Rightarrow x=-5,\ x=-\frac{7}{3}$$

$$\begin{array}{ll} \downarrow & \downarrow \\ 3x & 7 \\ x & 5 \end{array}$$

Yanıt / Answer B

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10. $$2-\cfrac{3+\cfrac{2}{1-\cfrac{1}{3}}}{1+\cfrac{1}{2}}=2-\cfrac{3+\cfrac{2}{\cfrac{2}{3}}}{\cfrac{3}{2}}=2-\cfrac{3+2\cdot\cfrac{3}{2}}{\cfrac{3}{2}}$$

$$=2-\cfrac{3+3}{\cfrac{3}{2}}=2-\cfrac{6}{\cfrac{3}{2}}=2-6\cdot\frac{2}{3}=2-4=-2$$

Yanıt / Answer C

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11. $$\left(1-\frac{1}{4}\right)\cdot\left(1-\frac{1}{5}\right)\cdot\left(1-\frac{1}{6}\right)\cdots\cdots\left(1-\frac{1}{35}\right)\cdot\left(1-\frac{1}{36}\right)$$

$$=\frac{3}{4}\cdot\frac{4}{5}\cdot\frac{5}{6}\cdots\cdots\frac{34}{35}\cdot\frac{35}{36}=\frac{3}{36}=\frac{1}{12}$$

Yanıt / Answer D

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12. $$1+\underbrace{\cfrac{1}{\underbrace{2-\cfrac{1}{\underbrace{2-\cfrac{1}{x}}_{\longrightarrow 1}}}_{\longrightarrow 1}}}_{\longrightarrow 1}=2$$

$$2-\frac{1}{x}=1$$

$$\frac{1}{x}=1 \Rightarrow x=1$$

Yanıt / Answer D

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13. $$A=\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{1}{5}, \qquad B=\frac{1}{2}+\frac{2}{3}+\frac{3}{4}+\frac{4}{5}$$

$$A+B=\left(\frac{1}{2}+\frac{1}{2}\right)+\left(\frac{1}{3}+\frac{2}{3}\right)+\left(\frac{1}{4}+\frac{3}{4}\right)+\left(\frac{1}{5}+\frac{4}{5}\right)$$

$$A+B=\frac{2}{2}+\frac{3}{3}+\frac{4}{4}+\frac{5}{5} \Rightarrow A+B=4 \Rightarrow A=4-B$$

Yanıt / Answer A

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14. $$\left(-2\frac{1}{2}\right)^{-2}\cdot\left(2\frac{1}{12}\right)^{-1}\cdot\left(\frac{5^{-2}}{6^{-1}}\right)^{-2}$$

$$=\left(-\frac{5}{2}\right)^{-2}\cdot\left(\frac{25}{12}\right)^{-1}\cdot\left(\frac{5^{-2}}{6^{-1}}\right)^{-2}=\frac{2^2}{5^2}\cdot\frac{12}{25}\cdot\frac{5^4}{6^2}=\frac{4}{3}$$

Yanıt / Answer D

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15. $$\cfrac{\cfrac{\cfrac{2}{3}-1}{1-\cfrac{2}{3}}}{2}:\left(1\frac{1}{2}-2\right)=\cfrac{\cfrac{-\cfrac{1}{3}}{\cfrac{1}{3}}}{2}:\left(\frac{3}{2}-2\right)$$

$$=-\frac{1}{2}:\left(-\frac{1}{2}\right)=1$$

Yanıt / Answer E

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16. $$\frac{2007\frac{3}{5}-2008\frac{2}{5}}{1-2\frac{1}{5}}=\frac{2007+\frac{3}{5}-2008-\frac{2}{5}}{1-\frac{11}{5}}=\frac{\frac{1}{5}-1}{-\frac{6}{5}}$$

$$=\left(\frac{-4}{5}\right)\cdot\left(\frac{5}{-6}\right)=\frac{2}{3}$$

Yanıt / Answer D

1. $\left(\frac{1}{5}-\frac{1}{4}\right)\cdot\left(\frac{1}{2}-\frac{1}{3}\right)^{-1}=?$

A) $-\frac{3}{10}$　B) $-\frac{1}{10}$　C) -1　D) $\frac{3}{10}$　E) $\frac{1}{10}$

2. $\dfrac{1+\left(\frac{4}{3}\right)^{-2}}{\left(1-\frac{3}{4}\right)^{2}}:\left(\frac{2}{5}\right)^{-2}=?$

A) 16　B) 8　C) 4　D) $\frac{5}{16}$　E) $\frac{4}{5}$

3. $5-\dfrac{1}{1-\dfrac{1}{1+\dfrac{1}{2}}}\cdot\dfrac{2}{3}=?$

A) 0　B) 1　C) 2　D) 3　E) 4

4. $4+\dfrac{4+\dfrac{4+\dfrac{\vdots}{3}}{3}}{3}=?$

A) 4　B) 5　C) 6　D) 7　E) 8

5. $\left(1+\frac{1}{2}\right)\left(1+\frac{1}{3}\right)\cdot\left(1+\frac{1}{4}\right)\ldots\left(1+\frac{1}{x}\right)=51$

$\Rightarrow x=?$

A) 102　B) 101　C) 100　D) 99　E) 98

6. $x\in Z^{+}$,

$\frac{2}{9}\le\frac{x}{36}\le\frac{7}{8}\Rightarrow\sum x=?$

A) 113　B) 114　C) 120　D) 460　E) 468

7. $2-\dfrac{x}{6+\dfrac{8}{9}}=A\Rightarrow 4-\dfrac{2x}{7-\dfrac{1}{9}}=?$

A) A　B) 2A　C) 2A + 2

D) 3A + 5　E) $\frac{A}{2}+4$

8. $A=-\frac{8}{9}$,　$B=-\frac{22}{23}$,　$C=-\frac{100}{101}$

$\Rightarrow\ ?<?<?$

A) B < C < A　B) C < A < B　C) A < C < B

D) B < A < C　E) C < B < A

9. $$\frac{\left(2007-\frac{1}{3}\right)-\left(2008-\frac{2}{3}\right)}{\left(\frac{3}{4}-2008\right)+\left(2008-\frac{2}{5}\right)}=?$$

A) $-\frac{40}{39}$ B) $-\frac{40}{21}$ C) $-\frac{10}{39}$ D) $\frac{10}{39}$ E) $\frac{40}{21}$

10. $A=\frac{2}{57},\quad B=\frac{3}{121},\quad C=\frac{4}{207}$

$\Rightarrow\ ?<?<?$

A) $A<B<C$ B) $C<B<A$ C) $C<A<B$ D) $B<C<A$ E) $B<A<C$

11. $$2-\frac{1}{2-\frac{1}{2}}:\frac{2}{3}-\frac{1}{1+\frac{1}{2}}=?$$

A) $\frac{3}{4}$ B) $\frac{1}{3}$ C) $\frac{1}{2}$ D) $\frac{4}{3}$ E) $\frac{5}{3}$

12. $$\frac{\left(\frac{1}{7}-\frac{1}{4}+\frac{1}{8}\right)-\left(\frac{1}{8}+\frac{1}{4}+\frac{1}{7}\right)}{-\frac{1}{4}-\left(-\frac{1}{5}\right)}=?$$

A) 1 B) 2 C) 5 D) 10 E) 20

13. $$3+\cfrac{4}{3+\cfrac{4}{3+\cfrac{4}{\vdots}}}=A\ \Rightarrow\ A=?$$

A) 1 B) 2 C) 3 D) 4 E) 5

14. $$\left[1-\cfrac{1}{1+\cfrac{1}{1-\cfrac{1}{a}}}\right]=\left(\frac{1}{3}\right)^{-1}\ \Rightarrow\ a=?$$

A) $\frac{1}{5}$ B) $\frac{2}{5}$ C) $\frac{3}{5}$ D) $\frac{2}{3}$ E) $\frac{1}{3}$

15. $\frac{9}{16}+\frac{4}{9}-1=x^2$

$0<x\ \Rightarrow\ x=?$

A) $\frac{3}{25}$ B) $\frac{2}{25}$ C) $\frac{1}{25}$ D) $\frac{5}{12}$ E) $\frac{1}{12}$

16. $$\left(1-\frac{1}{2^2}\right)\cdot\left(1-\frac{1}{3^2}\right)\cdot\left(1-\frac{1}{4^2}\right)\cdot\ldots\cdot\left(1-\frac{1}{10^2}\right)=?$$

A) $\frac{9}{20}$ B) $\frac{11}{10}$ C) $\frac{11}{20}$ D) $\frac{9}{10}$ E) $\frac{10}{11}$

[AKDENİZ ÜNV.-YÖS 2013]

Yanıtlar / *Answers*

1. A	4. C	7. B	10. B	13. D	16. C
2. C	5. B	8. E	11. B	14. C	
3. D	6. E	9. B	12. D	15. E	

1. $$\left(\underset{(4)}{\frac{1}{5}}-\underset{(5)}{\frac{1}{4}}\right)\cdot\left(\underset{(3)}{\frac{1}{2}}-\underset{(2)}{\frac{1}{3}}\right)^{-1}$$

$$=\left(-\frac{1}{20}\right)\cdot\left(\frac{1}{6}\right)^{-1}=\left(-\frac{1}{20}\right)\cdot(6)=-\frac{3}{10}$$

Yanıt / Answer A

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2. $$\frac{1+\left(\frac{4}{3}\right)^{-2}}{\left(1-\frac{3}{4}\right)^{2}}:\left(\frac{2}{5}\right)^{-2}=\frac{1+\left(\frac{3}{4}\right)^{2}}{\left(\frac{1}{4}\right)^{2}}:\left(\frac{5}{2}\right)^{2}$$

$$=\frac{1+\frac{9}{16}}{\frac{1}{16}}:\frac{25}{4}=\frac{\frac{25}{16}}{\frac{1}{16}}:\frac{25}{4}=\frac{25}{16}\cdot\frac{16}{1}\cdot\frac{4}{25}=4$$

Yanıt / Answer C

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3. $$5-\frac{1}{1-\frac{1}{1+\frac{1}{2}}}\cdot\frac{2}{3}=5-\frac{1}{1-\frac{1}{\frac{3}{2}}}\cdot\frac{2}{3}=5-\frac{1}{1-\frac{2}{3}}\cdot\frac{2}{3}$$

$$=5-\frac{1}{\frac{1}{3}}\cdot\frac{2}{3}=5-3\cdot\frac{2}{3}=3$$

Yanıt / Answer D

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4. $$4+\frac{4+\frac{4+\frac{\ddots}{3}}{3}}{3}=x$$

$$4+\frac{x}{3}=x$$

$$4=x-\frac{x}{3}$$

$$4=\frac{2x}{3}\Rightarrow\frac{4\cdot3}{2}=x\Rightarrow x=6$$

Yanıt / Answer C

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5. $$\left(1+\frac{1}{2}\right)\cdot\left(1+\frac{1}{3}\right)\cdot\left(1+\frac{1}{4}\right)\ldots\left(1+\frac{1}{x}\right)=51$$

$$\frac{3}{2}\cdot\frac{4}{3}\cdot\frac{5}{4}\cdot\ldots\cdot\frac{x+1}{x}=51$$

$$\frac{x+1}{2}=51\Rightarrow x+1=102\Rightarrow x=101$$

Yanıt / Answer B

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6. $$\underset{(8)}{\frac{2}{9}}\le\underset{(2)}{\frac{x}{36}}\le\underset{(9)}{\frac{7}{8}}$$

$$\frac{16}{72}\le\frac{2x}{72}\le\frac{63}{72}\Rightarrow16\le2x\le63$$

$$\frac{16}{2}\le\frac{2x}{2}\le\frac{63}{2}$$

$$8\le x\le31{,}5$$

$$x\in Z\Rightarrow\sum x=8+9+\ldots+31=\frac{31\cdot32}{2}-\frac{7\cdot8}{2}=468$$

Yanıt / Answer E

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7. $$2-\frac{x}{\underset{(9)}{\frac{6}{1}}+\underset{(1)}{\frac{8}{9}}}=A$$

$$2-\frac{x}{\frac{62}{9}}=A\Rightarrow2\left(2-\frac{x}{\frac{62}{9}}\right)=2A\Rightarrow4-\frac{2x}{\frac{62}{9}}=2A$$

$$4-\frac{2x}{7-\frac{1}{9}}=4-\frac{2x}{\frac{63-1}{9}}=4-\frac{2x}{\frac{62}{9}}=2A$$

Yanıt / Answer B

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8. $$A=-\frac{8}{9},\quad B=-\frac{22}{23},\quad C=-\frac{100}{101}$$

$$\frac{100}{101}>\frac{22}{23}>\frac{8}{9}\Rightarrow-\frac{100}{101}<-\frac{22}{23}<-\frac{8}{9}$$

$$\Rightarrow C<B<A$$

Yanıt / Answer E

9. $$\frac{\left(2007-\frac{1}{3}\right)-\left(2008-\frac{2}{3}\right)}{\left(\frac{3}{4}-2008\right)+\left(2008-\frac{2}{5}\right)}=\frac{2007-\frac{1}{3}-2008+\frac{2}{3}}{\frac{3}{4}-2008+2008-\frac{2}{5}}$$

$$=\frac{\frac{1}{3}-\frac{1}{\underset{(3)}{1}}}{\underset{(5)}{\frac{3}{4}}-\underset{(4)}{\frac{2}{5}}}=\frac{-\frac{2}{3}}{\frac{15}{20}-\frac{8}{20}}=\frac{-\frac{2}{3}}{\frac{7}{20}}=-\frac{2}{3}\cdot\frac{20}{7}=-\frac{40}{21}$$

Yanıt / Answer B

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10. $A=\underset{(6)}{\frac{2}{57}}$, $\quad B=\underset{(4)}{\frac{3}{121}}$, $\quad C=\underset{(3)}{\frac{4}{207}}$

$A=\frac{12}{342}$, $\quad B=\frac{12}{484}$, $\quad C=\frac{12}{621}$

$\Rightarrow C<B<A$

Yanıt / Answer B

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11. $$2-\frac{1}{2-\frac{1}{2}}:\frac{2}{3}-\frac{1}{1+\frac{1}{2}}$$

$$=2-\frac{1}{\frac{3}{2}}:\frac{2}{3}-\frac{1}{\frac{3}{2}}=2-\frac{2}{3}:\frac{2}{3}-\frac{2}{3}$$

$$=2-\frac{2}{3}\cdot\frac{3}{2}-\frac{2}{3}=2-1-\frac{2}{3}=\frac{1}{3}$$

Yanıt / Answer B

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12. $$\frac{\left(\frac{1}{7}-\frac{1}{4}+\frac{1}{8}\right)-\left(\frac{1}{8}+\frac{1}{4}+\frac{1}{7}\right)}{-\frac{1}{4}-\left(-\frac{1}{5}\right)}=\frac{\frac{1}{7}-\frac{1}{4}+\frac{1}{8}-\frac{1}{8}-\frac{1}{4}-\frac{1}{7}}{-\underset{(5)}{\frac{1}{4}}+\underset{(4)}{\frac{1}{5}}}$$

$$=\frac{\frac{-2}{4}}{\frac{-5}{20}+\frac{4}{20}}=\frac{-\frac{2}{4}}{-\frac{1}{20}}=\left(-\frac{2}{4}\right)\cdot(-20)=10$$

Yanıt / Answer D

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13. $$3+\frac{4}{3+\frac{4}{3+\frac{4}{\vdots}}}=A$$

$$3+\frac{4}{A}=A\ \Rightarrow\ \frac{3A+4}{A}=A$$

$$3A+4=A^2$$

$$A^2-3A-4=0$$

$$(A-4)\cdot(A+1)=0$$

$$A=4$$

Yanıt / Answer D

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14. $$\left[1-\frac{1}{1+\frac{1}{1-\frac{1}{a}}}\right]=\left(\frac{1}{3}\right)^{-1}\ \Rightarrow\ \left[1-\frac{1}{1+\frac{1}{1-\frac{1}{a}}}\right]=3$$

$$\frac{1}{1+\frac{1}{1-\frac{1}{a}}}=-2\ \Rightarrow\ 1+\frac{1}{1-\frac{1}{a}}=-\frac{1}{2}\ \Rightarrow\ \frac{1}{1-\frac{1}{a}}=-\frac{3}{2}$$

$$\Rightarrow 1-\frac{1}{a}=-\frac{2}{3}\ \Rightarrow\ 1+\frac{2}{3}=\frac{1}{a}\ \Rightarrow\ \frac{5}{3}=\frac{1}{a}\ \Rightarrow\ a=\frac{3}{5}$$

Yanıt / Answer C

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15. $$\frac{9}{16}+\frac{4}{9}-1=x^2\Rightarrow\left(\frac{3}{4}\right)^2+\left(\frac{2}{3}\right)^2-1=x^2$$

$$\left(\frac{3}{4}\right)^2-2\cdot\frac{3}{4}\cdot\frac{2}{3}+\left(\frac{2}{3}\right)^2=x^2$$

$$\left(\frac{3}{4}-\frac{2}{3}\right)^2=x^2$$

$$\underset{(3)}{\frac{3}{4}}-\underset{(4)}{\frac{2}{3}}=x\ \Rightarrow\ \frac{1}{12}=x$$

Yanıt / Answer E

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16. $$\left(1-\frac{1}{2^2}\right)\cdot\left(1-\frac{1}{3^2}\right)\cdot\left(1-\frac{1}{4^2}\right)\cdot\ldots\cdot\left(1-\frac{1}{10^2}\right)$$

$$=\left(1-\frac{1}{2}\right)\cdot\left(1+\frac{1}{2}\right)\cdot\left(1-\frac{1}{3}\right)\cdot\left(1+\frac{1}{3}\right)\cdot\left(1-\frac{1}{4}\right)\cdot\left(1+\frac{1}{4}\right)\cdot$$

$$\ldots\left(1-\frac{1}{10}\right)\cdot\left(1+\frac{1}{10}\right)$$

$$=\frac{1}{2}\cdot\frac{2}{3}\cdot\frac{3}{4}\cdot\ldots\cdot\frac{9}{10}\cdot\frac{3}{2}\cdot\frac{4}{3}\cdot\frac{5}{4}\cdot\ldots\cdot\frac{11}{10}$$

$$=\frac{1}{10}\cdot\frac{11}{2}=\frac{11}{20}$$

Yanıt / Answer C

1. $\dfrac{0,12}{0,024}+\dfrac{0,63}{0,9}-\dfrac{0,35}{0,07}=?$

A) $\dfrac{7}{10}$ B) $\dfrac{1}{3}$ C) $\dfrac{2}{5}$ D) $\dfrac{5}{2}$ E) $\dfrac{5}{12}$

2. $\dfrac{0,0026}{0,002}+\dfrac{0,028}{0,04}-\dfrac{0,04}{2(0,02)}=?$

A) $\dfrac{1}{5}$ B) $\dfrac{1}{10}$ C) 1 D) $\dfrac{7}{10}$ E) $\dfrac{13}{10}$

3. $\dfrac{0,4}{0,032}+\dfrac{0,05}{0,002}-\dfrac{3}{0,02}=?$

A) 105 B) 107,5 C) –110 D) –112,5 E) –115

4. $\dfrac{0,02}{1,4}+\dfrac{0,21}{0,7}-\dfrac{0,36}{2,1}=?$

A) $\dfrac{1}{3}$ B) $\dfrac{1}{4}$ C) $\dfrac{1}{6}$ D) $\dfrac{1}{7}$ E) $\dfrac{1}{9}$

5. $\dfrac{0,03}{0,3}+\dfrac{4,2}{0,21}-\dfrac{0,02}{0,04}=?$

A) 0,196 B) 1,96 C) 19,6 D) 19,2 E) 1,92

6. $[2 \cdot (0,05 - 0,82 + 0,07)] : 0,7 = ?$

A) –0,4 B) –0,2 C) –2 D) –4 E) –6

7. $\dfrac{2,3}{0,46}+\dfrac{1,2}{0,2}-\dfrac{0,56}{0,007}=?$

A) –69 B) –63 C) –51 D) 9 E) 17

8. $\dfrac{0,004}{0,0002}-\dfrac{0,16}{0,008}+\dfrac{0,018}{0,0003}=?$

A) 30 B) 40 C) 50 D) 60 E) 80

9. $\dfrac{0,\overline{3}-0,\overline{4}}{0,3-0,4}=?$

A) $\dfrac{9}{10}$ B) $\dfrac{10}{9}$ C) 1 D) 2 E) 3

10. $\dfrac{4,\overline{9}+3,\overline{9}+2,\overline{9}}{5,\overline{9}}=?$

A) $\dfrac{3}{5}$ B) $\dfrac{4}{5}$ C) 1 D) $\dfrac{6}{5}$ E) 2

11. $\dfrac{0,\overline{6}+0,\overline{4}}{0,\overline{17}+0,\overline{83}}\cdot(4,\overline{9})=?$

A) $\dfrac{11}{2}$ B) $\dfrac{10}{3}$ C) 11 D) 10 E) 9

12. $8-\dfrac{0,\overline{6}}{1-1,\overline{6}}=\dfrac{36}{x}\Rightarrow x=?$

A) 1 B) 2 C) 3 D) 4 E) 5

13. $0,7\overline{6}+\dfrac{1,\overline{4}-2\dfrac{1}{9}}{3+\dfrac{1}{3}}=?$

A) $\dfrac{1}{2}$ B) $\dfrac{17}{30}$ C) $\dfrac{3}{5}$ D) $\dfrac{29}{30}$ E) 1

14. $\dfrac{0,\overline{3}}{3}+\dfrac{0,\overline{4}}{4}=?$

A) $\dfrac{1}{9}$ B) $\dfrac{2}{9}$ C) $\dfrac{1}{3}$ D) $\dfrac{2}{3}$ E) 1

15. $\dfrac{1}{0,1\overline{2}}+\dfrac{1}{0,2\overline{4}}=?$

A) $24,\overline{27}$ B) $24,\overline{7}$ C) $12,\overline{27}$ D) $12,\overline{7}$ E) $12,\overline{29}$

16. $\dfrac{2}{0,001}+\left(\dfrac{1,1}{0,1}+\dfrac{22,2}{0,2}+\dfrac{0,03}{0,003}\right)=?$

A) 2100 B) 2132 C) 2433 D) 2444 E) 2622

[KTÜ.-YÖS 2013]

Yanıtlar / *Answers*

1. A	4. D	7. A	10. E	13. B	16. B
2. C	5. C	8. D	11. A	14. B	
3. D	6. C	9. B	12. D	15. C	

1. $\frac{0,12}{0,024}+\frac{0,63}{0,9}-\frac{0,35}{0,07}$

$=\frac{120}{24}+\frac{63}{90}-\frac{35}{7}$

$=5+\frac{7}{10}-5=\frac{7}{10}$

Yanıt / Answer A

2. $\frac{0,0026}{0,002}+\frac{0,028}{0,04}-\frac{0,04}{2(0,02)}$

$=\frac{26}{20}+\frac{28}{40}-\frac{0,04}{0,04}$

$=\frac{13}{10}+\frac{7}{10}-1=\frac{20}{10}-1=1$

Yanıt / Answer C

3. $\frac{0,4}{0,032}+\frac{0,05}{0,002}-\frac{3}{0,02}$

$=\frac{400}{32}+\frac{50}{2}-\frac{300}{2}$

$=\underset{(5)}{\frac{25}{2}}-\underset{(10)}{\frac{125}{1}}=\frac{125}{10}-\frac{1250}{10}=-\frac{1125}{10}=-112,5$

Yanıt / Answer D

4. $\frac{0,02}{1,4}+\frac{0,21}{0,7}-\frac{0,36}{2,1}$

$=\frac{2}{140}+\frac{21}{70}-\frac{36}{210}$

$=\frac{1}{70}+\frac{21}{70}-\frac{12}{70}=\frac{10}{70}=\frac{1}{7}$

Yanıt / Answer D

5. $\frac{0,03}{0,3}+\frac{4,2}{0,21}-\frac{0,02}{0,04}$

$=\frac{3}{30}+\frac{420}{21}-\frac{2}{4}$

$=\frac{1}{10}+\underset{(10)}{\frac{20}{1}}-\underset{(5)}{\frac{1}{2}}$

$=\frac{1}{10}+\frac{200}{10}-\frac{5}{10}=\frac{196}{10}=19,6$

Yanıt / Answer C

6. $[2\cdot(0,05-0,82+0,07)]:0,7$

$=[2\cdot(-0,7)]:0,7$

$=2\cdot(-0,7):(0,7)$

$=-2$

Yanıt / Answer C

7. $\frac{2,3}{0,46}+\frac{1,2}{0,2}-\frac{0,56}{0,007}$

$=\frac{230}{46}+\frac{12}{2}-\frac{560}{7}$

$=5+6-80=-69$

Yanıt / Answer A

8. $\frac{0,004}{0,0002}-\frac{0,16}{0,008}+\frac{0,018}{0,0003}$

$=\frac{40}{2}-\frac{160}{8}+\frac{180}{3}$

$=20-20+60=60$

Yanıt / Answer D

9. $$\frac{0,\overline{3}-0,\overline{4}}{0,3-0,4}=\frac{\frac{3}{9}-\frac{4}{9}}{-0,1}=\frac{-\frac{1}{9}}{-\frac{1}{10}}=\frac{10}{9}$$

Yanıt / Answer B

10. $$\frac{4,\overline{9}+3,\overline{9}+2,\overline{9}}{5,\overline{9}}$$

$$\frac{\frac{49-4}{9}+\frac{39-3}{9}+\frac{29-2}{9}}{\frac{59-5}{9}}=\frac{5+4+3}{6}=\frac{12}{6}=2$$

Yanıt / Answer E

11. $$\frac{0,\overline{6}+0,\overline{4}}{0,\overline{17}+0,\overline{83}}\cdot(4,\overline{9})$$

$$=\frac{\frac{6}{9}+\frac{4}{9}}{\frac{17}{99}+\frac{83}{99}}\cdot\left(\frac{49-4}{9}\right)$$

$$=\frac{10}{9}\cdot\frac{99}{100}\cdot\frac{45}{9}=\frac{11}{2}$$

Yanıt / Answer A

12. $$8-\frac{0,\overline{6}}{1-1,\overline{6}}=\frac{36}{x}\;\Rightarrow\;8-\frac{\frac{6}{9}}{1-\frac{16-1}{9}}=\frac{36}{x}$$

$$\Rightarrow\;8-\frac{\frac{6}{9}}{1-\frac{15}{9}}=\frac{36}{x}\Rightarrow\;8-\frac{\frac{6}{9}}{-\frac{6}{9}}=\frac{36}{x}$$

$$\Rightarrow\;8-(-1)=\frac{36}{x}\;\Rightarrow\;9=\frac{36}{x}\;\Rightarrow\;x=4$$

Yanıt / Answer D

13. $$0,7\overline{6}+\frac{1,\overline{4}-2\frac{1}{9}}{3+\frac{1}{3}}=\frac{76-7}{90}+\frac{\frac{14-1}{9}-\frac{19}{9}}{\frac{10}{3}}$$

$$=\frac{69}{90}+\frac{\frac{13}{9}-\frac{19}{9}}{\frac{10}{3}}=\frac{23}{30}+\frac{(-6)}{30}=\frac{17}{30}$$

Yanıt / Answer B

14. $$\frac{0,\overline{3}}{3}+\frac{0,\overline{4}}{4}=\frac{\frac{3}{9}}{3}+\frac{\frac{4}{9}}{4}$$

$$=\frac{3}{9}\cdot\frac{1}{3}+\frac{4}{9}\cdot\frac{1}{4}=\frac{1}{9}+\frac{1}{9}=\frac{2}{9}$$

Yanıt / Answer B

15. $$\frac{1}{0,1\overline{2}}+\frac{1}{0,2\overline{4}}$$

$$=\frac{1}{\frac{12-1}{90}}+\frac{1}{\frac{24-2}{90}}$$

$$=\frac{90}{11}+\frac{90}{22}=\frac{135}{11}=12,\overline{27}$$

Yanıt / Answer C

16. $$\frac{2}{0,001}+\left(\frac{1,1}{0,1}+\frac{22,2}{0,2}+\frac{0,03}{0,003}\right)$$

$$=\frac{2000}{1}+\frac{11}{1}+\frac{222}{2}+\frac{30}{3}$$

$$=2000+11+111+10=2132$$

Yanıt / Answer B

1. $\dfrac{0,5+0,02+0,002}{0,2+0,061}+\dfrac{0,02+0,1}{0,03}=?$

A) 6 B) 7 C) 8 D) 9 E) 10

2. $\dfrac{0,06}{0,004}=\dfrac{x-3}{0,1\overline{9}} \Rightarrow x=?$

A) 3 B) 4 C) 5 D) 6 E) 8

3. $\dfrac{(0,0036)\cdot(0,015)}{(0,003)\cdot(0,009)}=?$

A) $\dfrac{1}{3}$ B) $\dfrac{1}{2}$ C) 1 D) 2 E) 3

4. $0,\overline{5}+0,0\overline{5}-0,\overline{2}=?$

A) $0,\overline{35}$ B) $0,3\overline{5}$ C) 0, 35 D) $0,\overline{38}$ E) $0,3\overline{8}$

5. $7,\overline{69}-5,\overline{03}+4,\overline{3}=?$

A) 5 B) 6 C) 7 D) 8 E) 9

6. $\left[(0,5)\cdot 2\dfrac{2}{5}\right]^{-1} : (1,4\overline{9}-2^{-1})=?$

A) $\dfrac{5}{6}$ B) $\dfrac{2}{3}$ C) $\dfrac{1}{2}$ D) $\dfrac{1}{3}$ E) $\dfrac{1}{6}$

7. $A\cdot(0,3\overline{5})=0,\overline{8} \Rightarrow A=?$

A) $\dfrac{3}{2}$ B) $\dfrac{5}{2}$ C) 3 D) $\dfrac{7}{2}$ E) 4

8. $0,\overline{6}+\dfrac{1+0,\overline{3}}{0,\overline{4}}=?$

A) $\dfrac{8}{3}$ B) $\dfrac{11}{3}$ C) $\dfrac{13}{3}$ D) $\dfrac{14}{3}$ E) $\dfrac{16}{3}$

9. $A = 0,1\overline{6}, \quad B = 0,08\overline{3}$

$\Rightarrow \mathbf{A + 2B = ?}$

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{1}{4}$ D) $\frac{1}{5}$ E) $\frac{1}{6}$

10. $A = 1,\overline{2}, \quad B = 0,0\overline{2}$

$\Rightarrow \frac{3}{B} - \frac{22}{A} = ?$

A) 144 B) 132 C) 128 D) 123 E) 117

11. $\frac{0,a\overline{bc} - 0,b\overline{ac}}{89(a-b)} = ?$

A) $\frac{1}{9}$ B) $\frac{1}{90}$ C) $\frac{1}{99}$ D) $\frac{1}{900}$ E) $\frac{1}{990}$

12. $\frac{(0,3)^2 + (0,4)\cdot(0,4)}{0,03} = A \quad \Rightarrow \quad A = ?$

A) 9 B) $\frac{26}{3}$ C) $\frac{25}{3}$ D) 8 E) $\frac{23}{3}$

13. $\frac{12\cdot(0,03)^2}{(0,3)^2} + \frac{0,52}{0,13} - \frac{0,24}{0,12} = ?$

A) 4 B) 3,4 C) 3 D) 2,4 E) 2,12

14. $\frac{(32,4)_5 + (1,4)_{10}}{(14,3)_5} = ?$

A) $\frac{1}{4}$ B) $\frac{3}{4}$ C) 2 D) 3 E) 4

15. $0,5 - \frac{0,2}{0,5 + \frac{0,2}{1-0,6}} = ?$

A) 0,1 B) 0,2 C) 0,3 D) 0,4 E) 0,5

16. $0,\overline{1} + 0,\overline{2} + 0,\overline{3} + 0,\overline{4} + \ldots + 0,\overline{9} = ?$

A) 4 B) $\frac{9}{2}$ C) 5 D) $\frac{11}{2}$ E) 6

Yanıtlar / *Answers*

1. A	4. E	7. B	10. E	13. E	16. C
2. D	5. C	8. B	11. E	14. C	
3. D	6. A	9. B	12. C	15. C	

1. $\dfrac{0,5+0,02+0,002}{0,2+0,061}+\dfrac{0,02+0,1}{0,03}$

$=\dfrac{0,522}{0,261}+\dfrac{0,12}{0,03}=2+4=6$

Yanıt / Answer A

---

2. $\dfrac{0,06}{0,004}=\dfrac{x-3}{0,1\overline{9}}$

$\dfrac{60}{4}=\dfrac{x-3}{\dfrac{19-1}{90}} \Rightarrow 15=\dfrac{90\cdot(x-3)}{18}$

$\Rightarrow 15\cdot 18=90\cdot(x-3)$

$3=x-3$

$x=6$

Yanıt / Answer D

---

3. $\dfrac{(0,0036)\cdot(0,015)}{(0,003)\cdot(0,009)}=\dfrac{\dfrac{36}{10000}\cdot\dfrac{15}{1000}}{\dfrac{3}{1000}\cdot\dfrac{9}{1000}}$

$=\dfrac{36\cdot 15}{30\cdot 9}=2$

Yanıt / Answer D

---

4. $0,\overline{5}+0,0\overline{5}-0,\overline{2}$

$=\underset{(10)}{\dfrac{5}{9}}+\underset{(1)}{\dfrac{5}{90}}-\underset{(10)}{\dfrac{2}{9}}$

$=\dfrac{50+5-20}{90}=\dfrac{35}{90}=\dfrac{7}{18}=0,3\overline{8}$

Yanıt / Answer E

---

5. $7,\overline{69}-5,\overline{03}+4,\overline{3}$

$=\dfrac{769-7}{99}-\dfrac{503-5}{99}+\dfrac{43-4}{9}$

$=\dfrac{762-498+429}{99}=\dfrac{693}{99}=7$

Yanıt / Answer C

---

6. $\left[(0,5)\cdot 2\dfrac{2}{5}\right]^{-1}:(1,4\overline{9}-2^{-1})$

$=\left(\dfrac{1}{2}\cdot\dfrac{12}{5}\right)^{-1}:\left(\dfrac{149-14}{90}-\dfrac{1}{2}\right)$

$=\dfrac{5}{6}:\left(\dfrac{3}{2}-\dfrac{1}{2}\right)=\dfrac{5}{6}$

Yanıt / Answer A

---

7. $A\cdot(0,3\overline{5})=0,\overline{8}$

$A\cdot\left(\dfrac{35-3}{90}\right)=\dfrac{8}{9} \Rightarrow A\cdot\dfrac{32}{90}=\dfrac{8}{9} \Rightarrow A=\dfrac{5}{2}$

Yanıt / Answer B

---

8. $0,\overline{6}+\dfrac{1+0,\overline{3}}{0,\overline{4}}=\dfrac{6}{9}+\dfrac{1+\dfrac{3}{9}}{\dfrac{4}{9}}$

$=\dfrac{6}{9}+\dfrac{\dfrac{12}{9}}{\dfrac{4}{9}}=\dfrac{2}{3}+\dfrac{12}{9}\cdot\dfrac{9}{4}=\dfrac{2}{3}+3=\dfrac{11}{3}$

Yanıt / Answer B

9. $A = 0,1\overline{6}, \qquad B = 0,08\overline{3}$

$$A = \frac{16-1}{90} = \frac{15}{90} = \frac{1}{6}$$

$$B = \frac{83-8}{900} = \frac{75}{900} = \frac{1}{12}$$

$$A + 2B = \frac{1}{6} + 2\cdot\frac{1}{12} = \frac{1}{6} + \frac{1}{6} = \frac{2}{6} = \frac{1}{3}$$

Yanıt / Answer B

10. $A = 1,\overline{2}\,, \quad B = 0,0\overline{2}$

$$A = \frac{12-1}{9} = \frac{11}{9} \quad , \qquad B = \frac{2}{90}$$

$$\frac{3}{B} - \frac{22}{A} = \frac{3}{\frac{2}{90}} - \frac{22}{\frac{11}{9}} = 3\cdot\frac{90}{2} - 22\cdot\frac{9}{11}$$

$$= 135 - 18 = 117$$

Yanıt / Answer E

11. $$\frac{0,a\overline{bc} - 0,b\overline{ac}}{89(a-b)} = \frac{\frac{abc - a - (bac - b)}{990}}{89(a-b)}$$

$$= \frac{100a + 10b + c - a - 100b - 10a - c + b}{990\cdot 89(a-b)}$$

$$= \frac{89a - 89b}{89(a-b)\cdot 990} = \frac{1}{990}$$

Yanıt / Answer E

12. $$\frac{(0,3)^2 + (0,4)\cdot(0,4)}{0,03}$$

$$= \frac{0,09 + 0,16}{0,03} = \frac{0,25}{0,03} = \frac{25}{3}$$

Yanıt / Answer C

13. $$\frac{12\cdot(0,03)^2}{(0,3)^2} + \frac{0,52}{0,13} - \frac{0,24}{0,12}$$

$$= \frac{12\cdot(0,03)\cdot(0,03)}{(0,3)\cdot(0,3)} + \frac{52}{13} - \frac{24}{12}$$

$$= \frac{12\cdot 3\cdot 3}{30\cdot 30} + 4 - 2 = 0,12 + 2 = 2,12$$

Yanıt / Answer E

14. $$\frac{(32,4)_5 + (1,4)_{10}}{(14,3)_5} = \frac{2\cdot 5^0 + 3\cdot 5^1 + 4\cdot 5^{-1} + 1,4}{4\cdot 5^0 + 1\cdot 5^1 + 3\cdot 5^{-1}}$$

$$= \frac{2 + 15 + \frac{4}{5} + 1,4}{4 + 5 + \frac{3}{5}} = \frac{18,4 + 0,8}{9 + 0,6} = \frac{19,2}{9,6} = 2$$

Yanıt / Answer C

15. $$0,5 - \frac{0,2}{0,5 + \frac{0,2}{1 - 0,6}}$$

$$= 0,5 - \frac{0,2}{0,5 + \frac{0,2}{0,4}} = 0,5 - \frac{0,2}{0,5 + 0,5}$$

$$= 0,5 - \frac{0,2}{1} = 0,5 - 0,2 = 0,3$$

Yanıt / Answer C

16. $0,\overline{1} + 0,\overline{2} + 0,\overline{3} + \ldots + 0,\overline{9}$

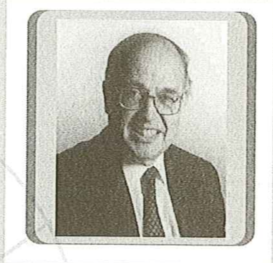
$$= \frac{1}{9} + \frac{2}{9} + \frac{3}{9} + \ldots + \frac{9}{9}$$

$$= \frac{1 + 2 + 3 + \ldots + 9}{9} = \frac{9\cdot 10}{2}\cdot\frac{1}{9} = 5$$

Yanıt / Answer C

ÜNİTE 2

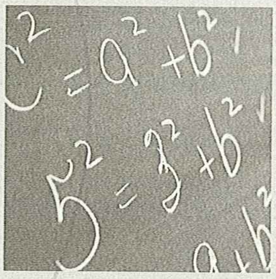
UNIT

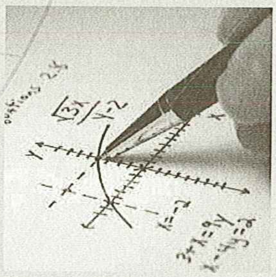


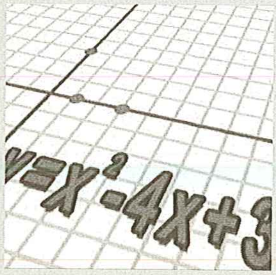
Atiyah, Sir Michael Francis [1929 –]

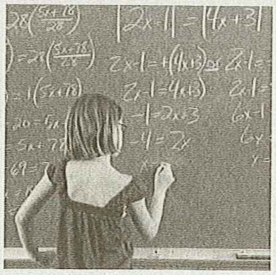
Topoloji, geometri, analiz, cebirsel değişimlerin transdantal teorisi, diferansiyel işlemler ve kuantum alan teorisine önemli katkıları olan İngiliz matematikçidir. 1966'da Field Medal, 2004'de Abel ödülü ile ödüllendirilmiştir.

British mathematician who made important contributions in topology, geometry, analysis, the transcendantal theory of algebraic varieties, differential operators and quantum field theory. Awarded the Fields Medal in 1966 and the Abel Prize in 2004.



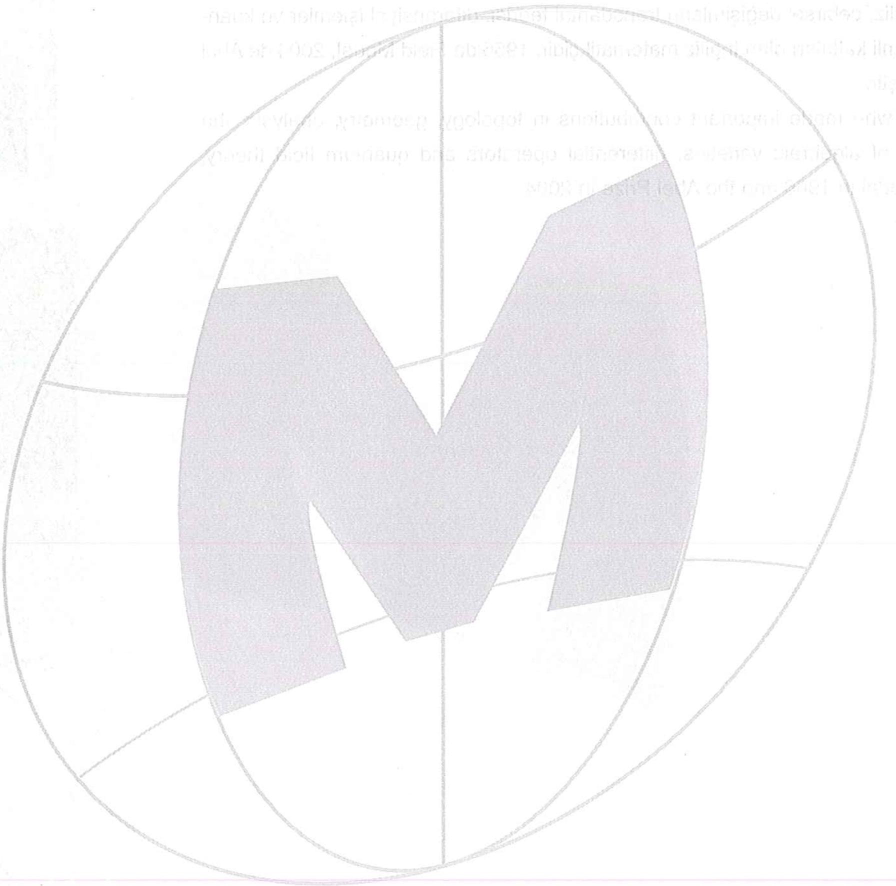






✓ **ÖZDEŞLİKLER ve ÇARPANLARA AYIRMA** .... **49 – 68**
✓ **ORAN ve ORANTI** .... **69 – 84**

✓ IDENTITIES and FACTORIZATION .... 49 – 68
✓ RATIO and PROPORTION .... 69 – 84



Çarpanlara Ayırma / Factorization Test 1

1. $(x-2y)^2-(2x-y)^2=A\cdot(x^2-y^2) \Rightarrow$ **A = ?**

A) –3 B) –2 C) 2 D) 3 E) 5

2. $\left.\begin{matrix} x-y=3 \\ y+z=7 \end{matrix}\right\} \Rightarrow \mathbf{x\cdot y+x\cdot z+yz+z^2=?}$

A) 40 B) 50 C) 60 D) 70 E) 80

3. $(2x-y)^2-9(2x-y)+14=A\cdot(2x-y-7) \Rightarrow$ **A = ?**

A) $2x-y$ B) $2x+y$ C) $2x-y-2$ D) $2x+y-2$ E) $2x+y-7$

4. $x^4-6x^2+5=A\cdot B\cdot C \Rightarrow$ **A = ?**

A) x^2+5 B) x^2-3 C) x^2-2 D) $x-2$ E) $x+1$

5. $2x^2+7x+3=A\cdot(x+3) \Rightarrow$ **A = ?**

A) $2x-1$ B) $2x+1$ C) $x-3$ D) $x+4$ E) $x+1$

6. $A\in N$,

$x^2+\frac{1}{x^2}=27,\quad x-\frac{1}{x}=A \Rightarrow$ **A = ?**

A) $3\sqrt{3}$ B) $2\sqrt{3}$ C) 5 D) 3 E) 2

7. $(0,026)^2-(0,024)^2=(0,001)\cdot A \Rightarrow$ **A = ?**

A) $\frac{1}{10}$ B) $\left(\frac{1}{10}\right)^2$ C) $\left(\frac{1}{10}\right)^3$ D) $\frac{1}{5}$ E) $\frac{1}{50}$

8. $\frac{1}{x}+\frac{1}{y}=5\left(\frac{1}{x}-\frac{1}{y}\right) \Rightarrow \mathbf{\frac{y}{x}=?}$

A) $\frac{1}{2}$ B) 1 C) $\frac{3}{2}$ D) 2 E) $\frac{5}{2}$

9. $\dfrac{(x^2+xy)^2}{x^4+xy^3} : \dfrac{x^2+xy}{x^3-x^2y+xy^2} = ?$

A) x B) y C) $\dfrac{x}{y}$ D) $\dfrac{y}{x}$ E) xy

10. $y > 1$,

$\dfrac{x+y}{2y-x} : \dfrac{y^3-x^2y}{x^2-3xy+2y^2} = \dfrac{y}{3y-2} \Rightarrow$ **y = ?**

A) 7 B) 6 C) 5 D) 3 E) 2

11. $\left(\dfrac{x^2-xy}{y^2-1} \cdot \dfrac{y^3+y^2}{x^3-x^2y}\right) : \dfrac{x}{y-1} = ?$

A) $\dfrac{x}{y}$ B) $\dfrac{x^2}{y^2}$ C) $\dfrac{y}{x}$ D) $\dfrac{y^2}{x^2}$ E) $\dfrac{y^2}{x}$

12. $\dfrac{1}{x^{m-n}+1} + \dfrac{1}{x^{n-m}+1} = ?$

A) x^m B) x^n C) x^{n-m} D) x^{m-n} E) 1

13. $\dfrac{3x^2-12x-15}{3x^2+ax+b} = \dfrac{(x-5)}{(x+3)} \Rightarrow$ **a + b = ?**

A) 25 B) 21 C) 17 D) 15 E) 12

14. $\dfrac{x^2+xy}{x^2+y^2} \cdot \left(\dfrac{x}{x-y} - \dfrac{y}{x+y}\right) : \dfrac{1}{x-y} = ?$

A) 1 B) x C) $\dfrac{1}{x}$ D) y E) $\dfrac{1}{y}$

15. $\left(\dfrac{x}{1+\dfrac{1}{x}} - \dfrac{x}{1-\dfrac{1}{x}}\right) \cdot \left(x - \dfrac{1}{x}\right) = ?$

A) $-2x$ B) $-x$ C) x D) $2x$ E) $3x$

16. $x = 3 - y \Rightarrow \dfrac{(x+y)^2-xy}{x^3-y^3} : \dfrac{x+y}{x-y} = ?$

A) 1 B) $\dfrac{1}{2}$ C) $\dfrac{1}{3}$

D) 0 E) $\dfrac{1}{4}$

[ANADOLU ÜNV. YÖS 2011]

Yanıtlar / *Answers*

1. A	4. E	7. A	10. E	13. B	16. C
2. D	5. B	8. C	11. D	14. B	
3. C	6. C	9. A	12. E	15. A	

1. $[(x-2y)-(2x-y)]\cdot[(x-2y)+(2x-y)] = A(x^2-y^2)$

$$(x-2y-2x+y)\cdot(x-2y+2x-y) = A(x^2-y^2)$$

$$(-x-y)\cdot(3x-3y) = -(x+y)\cdot 3(x-y) = A(x^2-y^2)$$

$$= -3(x^2-y^2) = A\cdot(x^2-y^2)$$

$$\Rightarrow A = -3$$

Yanıt / Answer A

---

2. $x\cdot y + x\cdot z + y\cdot z + z^2 = x(y+z) + z(y+z)$

$$= (y+z)(x+z)$$

$$\left.\begin{array}{l} y+z=7 \\ x+z=10 \end{array}\right\} \Rightarrow (y+z)\cdot(x+z) = 7\cdot 10 = 70$$

Yanıt / Answer D

---

3. $2x-y=t$

$$\Rightarrow t^2-9t+14 = A\cdot(t-7)$$

$$(t-7)\cdot(t-2) = A(t-7)$$

$$\Rightarrow A = t-2$$

$$A = 2x-y-2$$

Yanıt / Answer C

---

4. $x^2 = t$

$$\Rightarrow t^2-6t+5 = A\cdot B\cdot C$$

$$(t-1)\cdot(t-5) = A\cdot B\cdot C$$

$$(x^2-1)\cdot(x^2-5) = A\cdot B\cdot C$$

$$(x+1)\cdot(x-1)\cdot(x^2-5) = A\cdot B\cdot C$$

$$\Rightarrow A = x+1$$

Yanıt / Answer E

---

5. $2x^2+7x+3 = (2x+1)\cdot(x+3) = A(x+3)$

$2x \quad 1$

$x \quad 3$

$$\Rightarrow A = 2x+1$$

Yanıt / Answer B

---

6. $x-\frac{1}{x}=A \Rightarrow x^2-2\cdot x\cdot\frac{1}{x}+\frac{1}{x^2}=A^2$

$$x^2-2+\frac{1}{x^2}=A^2$$

$$27-2=A^2 \Rightarrow A^2=25$$

$$A=5$$

Yanıt / Answer C

---

7. $(0{,}026)^2-(0{,}024)^2=(0{,}001)\cdot A$

$$(0{,}026-0{,}024)\cdot(0{,}026+0{,}024)=(0{,}001)\cdot A$$

$$(0{,}002)\cdot(0{,}05)=(0{,}001)\cdot A$$

$$2\cdot(0{,}05)=A$$

$$0{,}1=A=\frac{1}{10}$$

Yanıt / Answer A

---

8. $\frac{1}{x}+\frac{1}{y}=\frac{5}{x}-\frac{5}{y}$

$$\frac{6}{y}=\frac{4}{x} \Rightarrow 6x=4y$$

$$\Rightarrow \frac{y}{x}=\frac{6}{4}=\frac{3}{2}$$

Yanıt / Answer C

9. $$\frac{(x^2+xy)^2}{x(x^3+y^3)}\cdot\frac{x^3-x^2y+xy^2}{(x^2+xy)}$$

$$=\frac{x^2+xy}{x(x^3+y^3)}\cdot\frac{x(x^2-xy+y^2)}{1}$$

$$=\frac{x^2+xy}{(x+y)(x^2-xy+y^2)}\cdot\frac{(x^2-xy+y^2)}{1}$$

$$=\frac{x^2+xy}{x+y}=\frac{x(x+y)}{x+y}=x$$

Yanıt / Answer A

10. $$\frac{x+y}{2y-x}\cdot\frac{x^2-3xy+2y^2}{y(y^2-x^2)}$$

$$\frac{x+y}{2y-x}\cdot\frac{(x-2y)\cdot(x-y)}{y(y-x)\cdot(y+x)}=(-1)\cdot(-\frac{1}{y})=\frac{y}{3y-2}$$

$$\Rightarrow\ \frac{1}{y}=\frac{y}{3y-2}$$

$$3y-2=y^2\ \Rightarrow\ y^2-3y+2=0$$

$$y\qquad -2$$

$$y\qquad -1$$

$$\Rightarrow y=2$$

Yanıt / Answer E

11. $$\left(\frac{x^2-xy}{(y-1)\cdot(y+1)}\cdot\frac{y^2(y+1)}{x(x^2-xy)}\right):\frac{x}{y-1}$$

$$\frac{1}{y-1}\cdot\frac{y^2}{x}\cdot\frac{y-1}{x}=\frac{y^2}{x^2}$$

Yanıt / Answer D

12. $$\frac{1}{x^{m-n}+1}+\frac{1}{x^{n-m}+1}=\frac{1}{\frac{x^m}{x^n}+1}+\frac{1}{\frac{x^n}{x^m}+1}$$

$$=\frac{x^n}{x^m+x^n}+\frac{x^m}{x^n+x^m}$$

$$=\frac{x^n+x^m}{x^n+x^m}=1$$

Yanıt / Answer E

13. $$\frac{3x^2-12x-15}{3x^2+ax+b}=\frac{x-5}{x+3}$$

$$\frac{3(x+1)\cdot(x-5)}{3x^2+ax+b}=\frac{x-5}{x+3}$$

$$\Rightarrow\ 3x^2+ax+b=3\cdot(x+1)\cdot(x+3)$$

$$3x^2+ax+b=3(x^2+4x+3)$$

$$3x^2+ax+b=3x^2+12x+9$$

$$\Rightarrow\ a=12,\quad b=9\quad\Rightarrow\ a+b=21$$

Yanıt / Answer B

14. $$\frac{x^2+xy}{x^2+y^2}\cdot\left(\frac{x}{x-y}-\frac{y}{x+y}\right):\frac{1}{x-y}$$

$$\frac{x^2+xy}{x^2+y^2}\cdot\left(\frac{x^2+xy-xy+y^2}{x^2-y^2}\right):\frac{1}{x-y}$$

$$\frac{x(x+y)}{x^2+y^2}\cdot\frac{x^2+y^2}{(x-y)\cdot(x+y)}\cdot\frac{x-y}{1}=x$$

Yanıt / Answer B

15. $$\left(\frac{x}{1+\frac{1}{x}}-\frac{x}{1-\frac{1}{x}}\right)\cdot\left(x-\frac{1}{x}\right)$$

$$=\left(\frac{x^2}{\underset{(x-1)}{x+1}}-\frac{x^2}{\underset{(x+1)}{x-1}}\right)\cdot\left(\frac{x^2-1}{x}\right)$$

$$=\frac{x^3-x^2-x^3-x^2}{(x+1)\cdot(x-1)}\cdot\frac{(x-1)\cdot(x+1)}{x}$$

$$=\frac{-2x^2}{(x+1)\cdot(x-1)}\cdot\frac{(x-1)\cdot(x+1)}{x}=-2x$$

Yanıt / Answer A

16. $$\frac{(x+y)^2-xy}{x-y}=\frac{x^2+y^2+xy}{(x-y)\cdot(x^2+xy+y^2)}\cdot\frac{x-y}{x+y}$$

$$=\frac{1}{x+y}=\frac{1}{3}$$

Yanıt / Answer C

1. $2x + y = 27,$

$4x^2 - y^2 = 27 \Rightarrow \mathbf{x + y = ?}$

A) 17 B) 19 C) 20 D) 21 E) 22

2. $x - y = 5 \quad \Rightarrow \quad \dfrac{x^2 - 4x - y^2 + 4}{x^2 - 2x - y^2 + 2y} = ?$

A) $\dfrac{1}{5}$ B) $\dfrac{2}{5}$ C) $\dfrac{3}{5}$ D) $\dfrac{4}{5}$ E) 1

3. $\dfrac{x^3 - y^3 + x^2y - xy^2}{x^2 - y^2} = ?$

A) $x \cdot y$ B) x C) y D) $x + y$ E) $x - y$

4. $\dfrac{9x}{y^2 - 3xy} - \dfrac{6}{y - 3x} + \dfrac{y}{xy - 3x^2} = ?$

A) $\dfrac{y - 3x}{xy}$ B) $\dfrac{y + 3x}{xy}$ C) $\dfrac{x - 3y}{xy}$

D) $\dfrac{x + 3y}{xy}$ E) $\dfrac{2x + y}{xy}$

5. $\left.\begin{array}{l} a - b = 6 \\ x - y = -2 \end{array}\right\} \Rightarrow \dfrac{ax + ay - bx - by}{x^2 - y^2} = ?$

A) –3 B) –2 C) 1 D) 2 E) 3

6. $\dfrac{(x^2 - 2x - 3)(x^2 + 2x - 8)(x - 1)}{(x^2 + x - 12)(x^2 - 1)} = ?$

A) $x - 1$ B) $x + 1$ C) $x - 2$

D) $x + 2$ E) x

7. $A \in N$

$x^2 + \dfrac{1}{4x^2} = 15, \; x + \dfrac{1}{2x} = A \;\Rightarrow\; \mathbf{A = ?}$

A) 1 B) 2 C) 3 D) 4 E) 5

8. $x^2 - 6xy + 10y^2 - 2y + 1 = 0 \;\Rightarrow\; \mathbf{x + y = ?}$

A) – 4 B) –3 C) 0 D) 3 E) 4

9. $x+\frac{1}{x}=3\sqrt{3} \Rightarrow \left(x-\frac{1}{x}\right)^2=?$

A) 27 B) 25 C) 23 D) 21 E) 19

10. $x^2+y^2-2x-4y+13=A \Rightarrow \min(A)=?$

A) 5 B) 6 C) 7 D) 8 E) 9

11. $\left.\begin{matrix} x+y=8 \\ x-z=2 \end{matrix}\right\} \Rightarrow \frac{xz+yz-x^2-xy}{y+z+2}=?$

A) –4 B) –2 C) –1 D) 2 E) 4

12. $\left.\begin{matrix} x-y=5 \\ y+z=7 \end{matrix}\right\} \Rightarrow xy-y^2+xz-yz-x-z=?$

A) 23 B) 24 C) 25 D) 26 E) 27

13. $2x+\frac{1}{x}=-3 \Rightarrow 4x^2+\frac{1}{x^2}=?$

A) –5 B) –4 C) –3 D) 4 E) 5

14. $x+y=z-x=2 \Rightarrow 2x^2-y^2-z^2=?$

A) – 10 B) –9 C) –8 D) –3 E) –4

15. $\left.\begin{matrix} \dfrac{1}{1+\frac{y}{x}}+\dfrac{\frac{y}{x}}{1-\frac{y}{x}}=A \\[2ex] \dfrac{1}{1-\frac{y}{x}}-\dfrac{\frac{y}{x}}{1+\frac{y}{x}}=B \end{matrix}\right\} \Rightarrow \frac{A}{B}=?$

A) 1 B) x C) y D) $\frac{x}{y}$ E) $\frac{y}{x}$

16. $\frac{(a+b)^2-ab}{a^3-b^3}:\frac{a^2+ab}{a^2-b^2}=?$

A) $a+b$ B) $\frac{1}{a-b}$ C) $\frac{1}{a}$

D) b E) a

[AKDENİZ ÜNV.-YÖS 2013]

Yanıtlar / *Answers*

1. C	4. A	7. D	10. D	13. E	16. C
2. C	5. A	8. E	11. B	14. C	
3. D	6. C	9. C	12. A	15. A	

1. $2x+y=27$

$$4x^2-y^2=27 \Rightarrow (2x-y)\cdot(2x+y)=27$$
$$(2x-y)\cdot 27=27$$
$$\Rightarrow 2x-y=1$$

$$\begin{array}{r} 2x-y=1 \\ +\ 2x+y=27 \\ \hline 4x=28 \Rightarrow x=7 \end{array}$$

$$\Rightarrow 2\cdot 7-y=1$$
$$y=13$$
$$x+y=7+13=20$$

Yanıt / Answer C

2. $$\frac{x^2-4x-y^2+4}{x^2-2x-y^2+2y}$$

$$=\frac{x^2-4x+4-y^2}{x^2-y^2-2(x-y)}=\frac{(x-2)^2-y^2}{x^2-y^2-2(x-y)}$$

$$=\frac{(x-2-y)\cdot(x-2+y)}{(x-y)\cdot(x+y)-2(x-y)}=\frac{(x-2-y)\cdot(x-2+y)}{(x-y)\cdot(x+y-2)}$$

$$=\frac{x-y-2}{x-y}=\frac{5-2}{5}=\frac{3}{5}$$

Yanıt / Answer C

3. $$\frac{x^3-y^3+x^2y-xy^2}{x^2-y^2}=\frac{x^3-y^3+xy(x-y)}{(x-y)\cdot(x+y)}$$

$$=\frac{(x-y)\cdot(x^2+xy+y^2)+xy(x-y)}{(x-y)\cdot(x+y)}$$

$$=\frac{(x-y)(x^2+xy+y^2+xy)}{(x-y)(x+y)}=\frac{(x+y)^2}{x+y}=x+y$$

Yanıt / Answer D

4. $$\frac{9x}{y^2-3xy}-\frac{6}{y-3x}+\frac{y}{xy-3x^2}$$

$$\frac{9x}{\underset{(x)}{y(y-3x)}}-\frac{6}{\underset{(xy)}{y-3x}}+\frac{y}{\underset{(y)}{x(y-3x)}}$$

$$\frac{9x^2-6xy+y^2}{xy\cdot(y-3x)}=\frac{(3x-y)^2}{xy\cdot(y-3x)}=\frac{y-3x}{xy}$$

Yanıt / Answer A

5. $$\frac{ax+ay-bx-by}{x^2-y^2}=\frac{a(x+y)-b(x+y)}{(x-y)(x+y)}$$

$$=\frac{(a-b)\cdot(x+y)}{(x-y)\cdot(x+y)}$$

$$=\frac{a-b}{x-y}=\frac{6}{-2}=-3$$

Yanıt / Answer A

6. $$\frac{(x^2-2x-3)\cdot(x^2+2x-8)\cdot(x-1)}{(x^2+x-12)\cdot(x^2-1)}$$

$$=\frac{(x-3)\cdot(x+1)\cdot(x+4)\cdot(x-2)\cdot(x-1)}{(x+4)\cdot(x-3)\cdot(x-1)\cdot(x+1)}=x-2$$

Yanıt / Answer C

7. $x^2+\dfrac{1}{4x^2}=15,\qquad x+\dfrac{1}{2x}=A$

$$\left(x+\frac{1}{2x}\right)^2=A^2 \Rightarrow x^2+2\cdot x\cdot\frac{1}{2x}+\frac{1}{4x^2}=A^2$$

$$=x^2+\frac{1}{4x^2}+1=A^2$$

$$=15+1=A^2 \Rightarrow A=4$$

Yanıt / Answer D

8. $x^2-6xy+10y^2-2y+1=0$

$x^2-6xy+9y^2+y^2-2y+1=0$

$(x^2-6xy+9y^2)+(y^2-2y+1)=0$

$(x-3y)^2+(y-1)^2=0$

$x-3y=0 \qquad y-1=0$

$x=3y \qquad y=1$

$y=1 \Rightarrow x=3\cdot 1=3$

$x+y=3+1=4$

Yanıt / Answer E

9. $$\left(x-\frac{1}{x}\right)^2=\left(x+\frac{1}{x}\right)^2-4\cdot x\cdot\frac{1}{x}$$

$$\left(x-\frac{1}{x}\right)^2=\left(3\sqrt{3}\right)^2-4$$

$$\left(x-\frac{1}{x}\right)^2=23$$

Yanıt / Answer C

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10. $x^2+y^2-2x-4y+13=A$

$(x^2-2x+1)+(y^2-4y+4)+8=A$

$(x-1)^2+(y-2)^2+8=A$

$0+8=\min(A)=8$

Yanıt / Answer D

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11. $$\frac{xz+yz-x^2-xy}{y+z+2}=\frac{z(x+y)-x(x+y)}{y+z+2}$$

$$=\frac{(x+y)\cdot(z-x)}{y+z+2}$$

$$\left.\begin{aligned}x+y&=8\\z-x&=-2\\y+z&=6\end{aligned}\right\}\Rightarrow\ \frac{8\cdot(-2)}{8}=-2$$

Yanıt / Answer B

---

12. $xy-y^2+xz-yz-x-z=y(x-y)+z(x-y)-(x+z)$

$=(y+z)\cdot(x-y)-(x+z)$

$$\left.\begin{aligned}x-y&=5\\y+z&=7\\x+z&=12\end{aligned}\right\}\Rightarrow\ (y+z)\cdot(x-y)-(x+z)=7\cdot5-12=23$$

Yanıt / Answer A

---

13. $$\left(2x+\frac{1}{x}\right)^2=(-3)^2$$

$$4x^2+2\cdot2x\cdot\frac{1}{x}+\frac{1}{x^2}=9$$

$$4x^2+\frac{1}{x^2}+4=9$$

$$4x^2+\frac{1}{x^2}=5$$

Yanıt / Answer E

---

14. $$\left.\begin{aligned}x+y&=2\\z-x&=2\end{aligned}\right\}\Rightarrow y+z=2+2=4$$

$2x^2-y^2-z^2=(x^2-y^2)+(x^2-z^2)$

$=(x-y)\cdot(x+y)+(x-z)\cdot(x+z)$

$=2(x-y)-2(x+z)$

$=2x-2y+(-2x-2z)$

$=-2y-2z=-2(y+z)=-2\cdot4=-8$

Yanıt / Answer C

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15. $$\frac{1}{1+\frac{y}{x}}+\frac{\frac{y}{x}}{1-\frac{y}{x}}=\frac{x}{\underset{(x-y)}{x+y}}+\frac{y}{\underset{(x+y)}{x-y}}$$

$$=\frac{x^2-xy+xy+y^2}{x^2-y^2}=\frac{x^2+y^2}{x^2-y^2}=A$$

$$\frac{1}{1-\frac{y}{x}}-\frac{\frac{y}{x}}{1+\frac{y}{x}}=\frac{x}{\underset{(x+y)}{x-y}}-\frac{y}{\underset{(x-y)}{x+y}}$$

$$=\frac{x^2+xy-xy+y^2}{x^2-y^2}=\frac{x^2+y^2}{x^2-y^2}=B$$

$$\Rightarrow\ \frac{A}{B}=\frac{\frac{x^2+y^2}{x^2-y^2}}{\frac{x^2+y^2}{x^2-y^2}}=1$$

Yanıt / Answer A

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16. $$\frac{(a+b)^2-ab}{a^3-b^3}:\frac{a^2+ab}{a^2-b^2}$$

$$=\frac{a^2+2ab+b^2-ab}{(a-b)\cdot(a^2+ab+b^2)}\cdot\frac{(a-b)\cdot(a+b)}{a(a+b)}$$

$$=\frac{1}{a}$$

Yanıt / Answer C

1. $\left.\begin{array}{l} x-\dfrac{y}{2}=2 \\ 4x^2-y^2=32 \end{array}\right\} \Rightarrow \mathbf{x+y=?}$

A) 4 B) 5 C) 8 D) 12 E) 16

2. $\dfrac{x^3-1}{x^2+x+1}-3=0 \quad \Rightarrow \quad \mathbf{x=?}$

A) 2 B) 4 C) 6 D) 8 E) 12

3. $x-y=15,\ \sqrt{x}+\sqrt{y}=5 \quad \Rightarrow \quad \mathbf{x \cdot y=?}$

A) 4 B) 6 C) 8 D) 12 E) 16

4. $\dfrac{x^2+ax+b}{x^2-3x-4}=\dfrac{x+2}{x+1} \quad \Rightarrow \quad \mathbf{\dfrac{b}{a}=?}$

A) 2 B) 4 C) 6 D) 8 E) 9

5. $\sqrt{x}-x=-1 \quad \Rightarrow \quad \mathbf{\sqrt{x}-\dfrac{1}{\sqrt{x}}=?}$

A) 0 B) x C) x − 1 D) −1 E) 1

6. $x^2=x-1 \Rightarrow \mathbf{x^6=?}$

A) x − 1 B) 1 − x C) x + 1 D) x E) 1

7. $\dfrac{\dfrac{x^2+y^2}{y}-x}{\dfrac{1}{y}-\dfrac{1}{x}} : \dfrac{x^4+y^3x}{x+y}=\mathbf{?}$

A) x B) y C) x + y D) 1 E) $\dfrac{1}{x-y}$

8. $\dfrac{x-\dfrac{1}{x}}{x^3-1} : \dfrac{x+1}{x^2+x+1}=\mathbf{?}$

A) $-\dfrac{1}{x}$ B) −x C) $\dfrac{1}{x}$ D) x E) x + 1

9. $x-\frac{1}{x}=\sqrt{5} \quad \Rightarrow \quad x^3+\frac{1}{x^3}=?$

A) 8 B) 12 C) 16 D) 18 E) 24

10. $x-\frac{1}{x}=3 \quad \Rightarrow x^3-\frac{1}{x^3}=?$

A) 27 B) 36 C) 38 D) 42 E) 48

11. $x \neq y$

$x^2-2xy+y^2+5x-5y=0 \quad \Rightarrow \mathbf{y-x=?}$

A) –5 B) –3 C) –1 D) 3 E) 5

12. $x^2-2x-4=0 \quad \Rightarrow \quad x^2+\frac{16}{x^2}=?$

A) 8 B) 10 C) 12 D) 14 E) 16

13. $\left.\begin{array}{l} x=4^{\frac{1}{3}}+4^{-\frac{1}{3}} \\ y=4^{\frac{1}{3}}-4^{-\frac{1}{3}} \end{array}\right\} \Rightarrow x^3-3x^2y+3xy^2-y^3=?$

A) 1 B) 2 C) 3 D) 4 E) 6

14. $\frac{x^3-3x^2+9x}{x^4+27x}\cdot\frac{x^2-x-12}{x+3}:\frac{4-x}{x^2+3x}=?$

A) –x B) x C) x + 1

D) x + 3 E) x – 4

15. $\frac{x^2y-5xy}{x^3-2x^2-3x}:\frac{x^2-4x-5}{(x^2-3x)(x+1)^2}=?$

A) xy B) x + 1 C) y + 1

D) x – 3 E) y – 3

16. $\frac{x^2+5x+6}{x^3+x^2-2x}\cdot\frac{x^3-x}{x^2+6x+5}=?$

A) $\frac{x+5}{x-1}$ B) $\frac{x-3}{x+1}$ C) $\frac{x-2}{x+2}$

D) $\frac{x+1}{x+3}$ E) $\frac{x+3}{x+5}$

[AKDENİZ ÜNV. YÖS -2013]

Yanıtlar / *Answers*

1. B	4. B	7. E	10. B	13. B	16. E
2. B	5. E	8. C	11. E	14. A	
3. E	6. E	9. D	12. C	15. A	

1.

$$x-\frac{y}{2}=2 \Rightarrow 2x-y=4$$

$$4x^2-y^2=(2x-y)\cdot(2x+y)=32 \Rightarrow 2x+y=8$$

$$\begin{array}{l} 2x-y=4 \\ +\ 2x+y=8 \\ \hline 4x=12 \end{array}$$

$$x=3 \Rightarrow 2\cdot3-y=4$$

$$y=2$$

$$x+y=3+2=5$$

Yanıt / Answer B

2.

$$\frac{x^3-1}{x^2+x+1}-3=\frac{(x-1)\cdot(x^2+x+1)}{x^2+x+1}-3=0$$

$$x-1-3=0$$

$$x=4$$

Yanıt / Answer B

3.

$$x-y=(\sqrt{x}+\sqrt{y})\cdot(\sqrt{x}-\sqrt{y})=15$$

$$5\cdot(\sqrt{x}-\sqrt{y})=15$$

$$\sqrt{x}-\sqrt{y}=3$$

$$\left.\begin{array}{l} \sqrt{x}+\sqrt{y}=5 \\ \sqrt{x}-\sqrt{y}=3 \end{array}\right\} \Rightarrow \begin{array}{l} 2\sqrt{x}=8 \Rightarrow x=16 \\ \sqrt{y}=1 \Rightarrow y=1 \end{array}$$

$$x\cdot y=16\cdot1=16$$

Yanıt / Answer E

4.

$$\frac{x^2+ax+b}{x^2-3x-4}=\frac{x^2+ax+b}{(x-4)\cdot(x+1)}=\frac{x+2}{x+1}$$

$$\Rightarrow x^2+ax+b=(x+2)\cdot(x-4)$$

$$x^2+ax+b=x^2-2x-8$$

$$\Rightarrow \frac{b}{a}=\frac{-8}{-2}=4$$

Yanıt / Answer B

5.

$$\sqrt{x}-x=-1 \Rightarrow \sqrt{x}=x-1$$

$$\underset{(\sqrt{x})}{\frac{\sqrt{x}}{1}}-\underset{(1)}{\frac{1}{\sqrt{x}}}=\frac{x-1}{\sqrt{x}}=\frac{\sqrt{x}}{\sqrt{x}}=1$$

Yanıt / Answer E

6.

$$x^6=x^2\cdot x^2\cdot x^2$$

$$=(x-1)\cdot(x-1)\cdot(x-1) \quad [\,x^2=x-1\,]$$

$$=(x^2-2x+1)\cdot(x-1)$$

$$=(x-1-2x+1)\cdot(x-1)$$

$$=-x(x-1)$$

$$=-x^2+x$$

$$=-(x-1)+x=1$$

Yanıt / Answer E

7.

$$\frac{\dfrac{x^2+y^2}{y}-x}{\dfrac{1}{y}-\dfrac{1}{x}}:\frac{x^4+y^3x}{x+y}$$

$$=\frac{\dfrac{x^2+y^2-xy}{y}}{\dfrac{x-y}{xy}}:\frac{x(x^3+y^3)}{x+y}$$

$$=\frac{(x^2+y^2-xy)\cdot xy}{y\cdot(x-y)}\cdot\frac{x+y}{x(x+y)\cdot(x^2+y^2-xy)}=\frac{1}{x-y}$$

Yanıt / Answer E

8.

$$\frac{x-\dfrac{1}{x}}{x^3-1}:\frac{x+1}{x^2+x+1}=\frac{\dfrac{x^2-1}{x}}{x^3-1}\cdot\frac{x^2+x+1}{x+1}$$

$$=\frac{(x-1)\cdot(x+1)}{x\cdot(x-1)\cdot(x^2+x+1)}\cdot\frac{x^2+x+1}{x+1}$$

$$=\frac{1}{x}$$

Yanıt / Answer C

9. $x-\frac{1}{x}=\sqrt{5} \Rightarrow x^2-2\cdot x\cdot\frac{1}{x}+\frac{1}{x^2}=5$

$$x^2+\frac{1}{x^2}=7 \Rightarrow (x+\frac{1}{x})^2=9$$

$$x+\frac{1}{x}=3$$

$$\Rightarrow x^3+\frac{1}{x^3}=\left(x+\frac{1}{x}\right)\cdot\left(x^2-1+\frac{1}{x^2}\right)=3\cdot6=18$$

Yanıt / Answer D

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10. $a^3-b^3=(a-b)^3+3ab(a-b)$

$$x^3-\frac{1}{x^3}=\left(x-\frac{1}{x}\right)^3+3x\cdot\frac{1}{x}\left(x-\frac{1}{x}\right)$$

$$=3^3+3\cdot3=36$$

Yanıt / Answer B

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11. $x^2-2xy+y^2+5x-5y=0$

$(x-y)^2+5(x-y)=0$

$(x-y)\cdot(x-y+5)=0$

$x\neq y \Rightarrow x-y+5=0$

$x-y=-5 \Rightarrow y-x=5$

Yanıt / Answer E

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12. $\frac{x^2-2x-4}{x}=\frac{0}{x}$

$$\frac{x^2}{x}-\frac{2x}{x}-\frac{4}{x}=0$$

$$x-2-\frac{4}{x}=0$$

$$\left(x-\frac{4}{x}\right)^2=2^2$$

$$x^2-2\cdot x\cdot\frac{4}{x}+\frac{16}{x^2}=4$$

$$x^2+\frac{16}{x^2}=12$$

Yanıt / Answer C

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13. $x^3-3x^2y+3xy^2-y^3=(x-y)^3$

$$=[4^{\frac{1}{3}}+4^{-\frac{1}{3}}-(4^{\frac{1}{3}}-4^{-\frac{1}{3}})]^3$$

$$=[2\cdot4^{-\frac{1}{3}}]^3$$

$$=8\cdot\frac{1}{4}=2$$

Yanıt / Answer B

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14. $\frac{x^3-3x^2+9x}{x^4+27x}\cdot\frac{x^2-x-12}{(x+3)}:\frac{4-x}{x^2+3x}$

$$=\frac{x(x^2-3x+9)}{x(x^3+27)}\cdot\frac{(x-4)\cdot(x+3)}{(x+3)}\cdot\frac{x(x+3)}{(4-x)}$$

$$=\frac{x(x^2-3x+9)}{x(x+3)\cdot(x^2-3x+9)}\cdot\frac{x-4}{1}\cdot\frac{x\cdot(x+3)}{4-x}$$

$$=\frac{1}{x+3}\cdot\frac{x-4}{1}\cdot\frac{x(x+3)}{4-x}=-x$$

Yanıt / Answer A

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15. $\frac{x^2y-5xy}{x^3-2x^2-3x}:\frac{x^2-4x-5}{(x^2-3x)\cdot(x+1)^2}$

$$=\frac{xy(x-5)}{x(x^2-2x-3)}\cdot\frac{x(x-3)\cdot(x+1)^2}{(x-5)\cdot(x+1)}$$

$$=\frac{xy}{x\cdot(x-3)\cdot(x+1)}\cdot\frac{x(x-3)\cdot(x+1)^2}{x+1}=xy$$

Yanıt / Answer A

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16. $\frac{x^2+5x+6}{x^3+x^2-2x}\cdot\frac{x^3-x}{x^2+6x+5}$

$$=\frac{(x+3)\cdot(x+2)}{x(x^2+x-2)}\cdot\frac{x(x-1)\cdot(x+1)}{(x+5)\cdot(x+1)}$$

$$=\frac{(x+3)\cdot(x+2)}{(x-1)(x+2)}\cdot\frac{(x-1)}{(x+5)}=\frac{x+3}{x+5}$$

Yanıt / Answer E

1. $\frac{x}{x+3}+\frac{6x+9}{x^2+3x}=?$

A) $1+\frac{1}{x}$ B) $1-\frac{1}{x}$ C) $1+\frac{3}{x}$

D) $x-\frac{3}{x}$ E) $x+\frac{3}{x}$

2. $x+y+z=7$

$xy+xz+yz=13 \Rightarrow \mathbf{x^2+y^2+z^2=?}$

A) 26 B) 25 C) 24 D) 23 E) 22

3. $x^3-y^3=49$

$xy(y-x)=5 \Rightarrow \mathbf{x-y=?}$

A) –8 B) –4 C) 1 D) 4 E) 8

4. $\frac{x^2-10x+21}{x^2-10x+25}=A$

$\frac{x^2-6x-7}{x^2-4x-5}=B \Rightarrow \frac{A}{B}=?$

A) $\frac{x-3}{x-5}$ B) $\frac{x+3}{x-5}$ C) $\frac{x-3}{x+5}$

D) $\frac{x+5}{x-3}$ E) $\frac{x-5}{x-3}$

5. $x^2+2y^2-2xy-4y+4=0$

$\Rightarrow \mathbf{x+y=?}$

A) –4 B) –2 C) 0 D) 2 E) 4

6. $\left.\begin{array}{l} A=\frac{1}{x}-\frac{1}{y} \\ B=y-\frac{1}{y} \end{array}\right\} \Rightarrow \frac{x\cdot A^2-x\cdot B^2}{A+B}=?$

A) 1 – xy B) –xy C) xy – 1

D) xy + 1 E) $1-x^2$

7. $\frac{(x-2)(x+3)}{ax^2+bx+c}=\frac{2x-4}{x-4} \Rightarrow \mathbf{a+b+c=?}$

A) –8 B) –7 C) –6 D) 6 E) 8

8. $x^2-6x+2=0 \Rightarrow \frac{x^4+4}{x^2}=?$

A) 36 B) 32 C) 30 D) 28 E) 24

9. $x - y = \sqrt{x} + \sqrt{y} = 7 \Rightarrow \mathbf{x + y = ?}$

A) 9 B) 16 C) 18 D) 25 E) 30

10. $x^2 + y^2 - 4x + 6y + 13 = 0 \Rightarrow \mathbf{x + y = ?}$

A) –1 B) 0 C) 1 D) 2 E) 3

11. $\dfrac{2x^2+3x+1}{4x^2-1} : \left(\dfrac{2x+1}{x} - 1\right) = ?$

A) $\dfrac{x}{2x-1}$ B) $\dfrac{x}{x-1}$ C) $\dfrac{2x-1}{x}$

D) $\dfrac{x-1}{x}$ E) $\dfrac{2x}{2x-1}$

12. $\dfrac{x^2+3x}{x+3} - \dfrac{2x^2-3x-2}{2x+1} = ?$

A) 2x B) x C) 1 D) 2 E) 3

13. $\left(\dfrac{x^2+x}{x-2} - \dfrac{2x^2-4x-6}{x^2-5x+6}\right) : \dfrac{x+1}{x-2} = ?$

A) x + 2 B) x – 2 C) 2x + 1

D) 2x – 1 E) 2x

14. $A \in Z^+$,

$$\left.\begin{aligned} x^2 + \frac{1}{x^2} &= 6 \\ x - \frac{1}{x} &= A \end{aligned}\right\} \Rightarrow \mathbf{A = ?}$$

A) 1 B) 2 C) 3 D) 4 E) 6

15. $\left(x + 4 + \dfrac{6}{x-1}\right) \cdot \left(\dfrac{x-1}{x+2}\right) = ?$

A) 2x – 1 B) 2x + 1 C) x + 1

D) x – 1 E) 2x

16. $x^2 - x + 1 = 0 \Rightarrow \mathbf{x^5 = ?}$

A) 1 – x B) x – 1 C) 0

D) 1 E) x

Yanıtlar / *Answers*

1. C	4. A	7. C	10. A	13. B	16. A
2. D	5. E	8. B	11. A	14. B	
3. D	6. A	9. D	12. D	15. C	

1.
$$\frac{x}{x+3}+\frac{6x+9}{x^2+3x}=\frac{x}{x+3}+\frac{6x+9}{x\cdot(x+3)}$$
$$=\frac{x^2+6x+9}{x(x+3)}$$
$$=\frac{(x+3)\cdot(x+3)}{x\cdot(x+3)}=\frac{x+3}{x}=1+\frac{3}{x}$$

Yanıt / Answer C

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2. $x+y+z=7,$

$(x+y+z)^2=49$

$x^2+y^2+z^2+2\cdot(xy+xz+yz)=49$

$xy+xz+yz=13 \Rightarrow x^2+y^2+z^2+2\cdot 13=49$

$x^2+y^2+z^2=23$

Yanıt / Answer D

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3. $(x-y)^3=x^3-3x^2y+3xy^2-y^3$

$=x^3-3xy(x-y)-y^3$

$=x^3+3xy(y-x)-y^3$

$=x^3+3\cdot 5-y^3$

$=49+15=64$

$(x-y)^3=64 \Rightarrow x-y=4$

Yanıt / Answer D

4.
$$\frac{x^2-10x+21}{x^2-10x+25}=\frac{(x-3)\cdot(x-7)}{(x-5)\cdot(x-5)}=A$$
$$\frac{x^2-6x-7}{x^2-4x-5}=\frac{(x-7)\cdot(x+1)}{(x-5)\cdot(x+1)}=B$$
$$\frac{A}{B}=\frac{\dfrac{(x-3)\cdot(x-7)}{(x-5)\cdot(x-5)}}{\dfrac{(x-7)\cdot(x+1)}{(x-5)\cdot(x+1)}}=\frac{x-3}{x-5}$$

Yanıt / Answer A

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5. $x^2+2y^2-2xy-4y+4=0$

$x^2-2xy+y^2+y^2-4y+4=0$

$(x-y)^2+(y-2)^2=0$

$$\left.\begin{array}{ll} y-2=0 & x-y=0 \\ y=2 & x=y=2 \end{array}\right\} \Rightarrow x+y=2+2=4$$

Yanıt / Answer E

6.
$$\frac{x\cdot A^2-x\cdot B^2}{A+B}=\frac{x\cdot(A+B)\cdot(A-B)}{A+B}$$
$$=x\cdot(A-B)$$
$$=x\cdot\left(\frac{1}{x}-\frac{1}{y}-y+\frac{1}{y}\right)$$
$$=x\cdot\left(\frac{1}{x}-y\right)$$
$$=1-xy$$

Yanıt / Answer A

7.
$$\frac{(x-2)\cdot(x+3)}{ax^2+bx+c}=\frac{2\cdot(x-2)}{(x-4)}$$
$$(x+3)\cdot(x-4)=2ax^2+2bx+2c$$
$$x^2-x-12=2ax^2+2bx+2c$$
$$2a+2b+2c=1-1-12=-12$$
$$a+b+c=-6$$

Yanıt / Answer C

8.
$$\frac{x^2-6x+12}{x}=\frac{0}{x}$$
$$\frac{x^2}{x}-\frac{6x}{x}+\frac{2}{x}=0$$
$$\left(x+\frac{2}{x}\right)^2=6^2$$
$$x^2+2\cdot x\cdot\frac{2}{x}+\frac{4}{x^2}=36$$
$$x^2+\frac{4}{x^2}=32$$
$$x^2+\frac{4}{x^2}=\frac{x^4+4}{x^2}=32$$

Yanıt / Answer B

9. $x-y=(\sqrt{x}+\sqrt{y})\cdot(\sqrt{x}-\sqrt{y})$

$7=7\cdot(\sqrt{x}-\sqrt{y})$

$\sqrt{x}-\sqrt{y}=1 \Rightarrow \sqrt{x}+\sqrt{y}=7$

$+\quad \sqrt{x}-\sqrt{y}=1$

$2\sqrt{x}=8$

$\sqrt{x}=4 \Rightarrow x=16$

$x=16 \Rightarrow y=9$

$x+y=16+9=25$

Yanıt / Answer D

10. $x^2+y^2-4x+6y+13=x^2-4x+4+y^2+6y+9=0$

$=(x-2)^2+(y+3)^2=0$

$\Rightarrow x=2,\quad y=-3$

$\Rightarrow x+y=-1$

Yanıt / Answer A

11. $\frac{2x^2+3x+1}{4x^2-1}:\left(\frac{2x+1}{x}-1\right)=\frac{(2x+1)\cdot(x+1)}{(2x-1)\cdot(2x+1)}:\left(\frac{2x+1-x}{x}\right)$

$=\frac{x+1}{2x-1}\cdot\frac{x}{x+1}=\frac{x}{2x-1}$

Yanıt / Answer A

12. $\frac{x^2+3x}{x+3}-\frac{2x^2-3x-2}{2x+1}=\frac{x(x+3)}{x+3}-\frac{(2x+1)\cdot(x-2)}{(2x+1)}$

$=x-x+2=2$

Yanıt / Answer D

13. $\left(\frac{x^2+x}{x-2}-\frac{2x^2-4x-6}{x^2-5x+6}\right):\frac{x+1}{x-2}$

$=\left(\frac{x^2+x}{x-2}-\frac{(2x+2)\cdot(x-3)}{(x-2)\cdot(x-3)}\right)\cdot\frac{x-2}{x+1}$

$=\frac{x^2+x-2x-2}{x-2}\cdot\frac{x-2}{x+1}$

$=\frac{x^2-x-2}{x-2}\cdot\frac{x-2}{x+1}$

$=\frac{(x+1)\cdot(x-2)}{x+1}=x-2$

Yanıt / Answer B

14. $x-\frac{1}{x}=A$

$x^2-2\cdot x\cdot\frac{1}{x}+\frac{1}{x^2}=A^2$

$x^2+\frac{1}{x^2}-2=A^2 \quad \left[x^2+\frac{1}{x^2}=6\right]$

$6-2=A^2$

$4=A^2 \Rightarrow A=2$

Yanıt / Answer B

15. $\left(x+4+\frac{6}{x-1}\right)\cdot\left(\frac{x-1}{x+2}\right)=\frac{(x+4)\cdot(x-1)+6}{x-1}\cdot\frac{x-1}{x+2}$

$=\frac{x^2+3x-4+6}{x-1}\cdot\frac{x-1}{x+2}$

$=\frac{(x+2)\cdot(x+1)}{x-1}\cdot\frac{x-1}{x+2}$

$=x+1$

Yanıt / Answer C

16. $\left.\begin{matrix}x^2-x+1=0\\ x^2=x-1\end{matrix}\right\}\Rightarrow x^5=(x^2)^2x$

$=(x-1)^2\cdot x$

$=(x^2-2x+1)\cdot x$

$=(x-1-2x+1)\cdot x$

$=-x\cdot x$

$=-x^2=1-x$

Yanıt / Answer A

1. $\left(\dfrac{x-4x^3}{4x^2-4x+1}\right)\cdot\left(1-\dfrac{2}{2x+1}\right)=?$

A) $-x$ B) $-x-2$ C) $x+3$ D) $x-1$ E) $x+1$

2. $\dfrac{x-\frac{1}{x^2}}{x-\frac{1}{x}}:\dfrac{x^2+x+1}{x^2+x}=?$

A) $\dfrac{x+1}{x-1}$ B) $\dfrac{x}{x+1}$ C) $\dfrac{x+1}{x}$ D) x E) 1

3. $\dfrac{x^4-1}{x^2+1}:\dfrac{x+1}{4}=?$

A) $4(x^2+1)$ B) $4(x-1)$ C) $\dfrac{4}{x-1}$ D) $\dfrac{x+1}{4}$ E) $4(x+1)$

4. $\dfrac{a}{b}+\dfrac{b}{a}=2 \Rightarrow \dfrac{a^4+b^4}{a^2b^2}=?$

A) 6 B) 5 C) 4 D) 3 E) 2

5. $\dfrac{\frac{2x+3}{x}}{4-\frac{9}{x^2}}\cdot(2x-3)=?$

A) $2x-3$ B) $2x$ C) x D) $\dfrac{1}{x}$ E) $\dfrac{1}{x^2}$

6. $\dfrac{a^3-8}{a^2-4}:\dfrac{a^2+2a+4}{a^2+4a+4}=?$

A) 2 B) $2a$ C) $-a-2$ D) $2-a$ E) $a+2$

7. $x, y \in R^+$,

$x^2-xy-12y^2=0 \Rightarrow \dfrac{2x^2+4y^2}{x\cdot y}=?$

A) 5 B) 6 C) 7 D) 8 E) 9

8. $\dfrac{x^2-xy+y^2}{x^3+y^3}:\dfrac{x}{x+y}=?$

A) $\dfrac{1}{x}$ B) y C) $x+y$ D) x E) $x-y$

9. $\dfrac{x(y^2-9)+y(x^2-9)}{xy-9}=?$

A) xy B) $x+y$ C) $x+3$ D) $x-3$ E) $x-y$

10. $2x-1-\dfrac{3x^2+2x-1}{x+1}=?$

A) $2x$ B) x C) $-x$ D) $-2x$ E) $-3x$

11. $\dfrac{a^2-25}{a^2-3a-10}\cdot\dfrac{a^2+a-2}{a^2+6a+5}=?$

A) $\dfrac{a+5}{a+1}$ B) $\dfrac{a+1}{a-1}$ C) $\dfrac{a-1}{a+1}$ D) 1 E) -1

12. $\left.\begin{aligned} y&>0\\ y-x&=6\\ y+z&=9\\ xy-yz+xz&=10\end{aligned}\right\}\Rightarrow x+y+z=?$

A) 11 B) 10 C) 9 D) 8 E) 7

13. $a+b=\dfrac{11}{2},\ a-b=\dfrac{8}{3}\Rightarrow 6a^2+3a-6b^2-3b=?$

A) 37 B) 40 C) 50 D) 88 E) 96

14. $\dfrac{a^3+b^3}{a-b}:\dfrac{a^3-a^2b+ab^2}{ab^2-a^2b}=?$

A) $a(a+b)$ B) $-a(a+b)$ C) $a+b$

D) $b(a+b)$ E) $-b(a+b)$

15. $\dfrac{\left(\dfrac{a}{b}-\dfrac{b}{a}\right)\cdot\left(1+\dfrac{2b}{a}+\dfrac{b^2}{a^2}\right)}{\left(\dfrac{1}{a^2}-\dfrac{1}{b^2}\right)\cdot\left(\dfrac{a}{b}+1\right)}:\dfrac{a+b}{a}=?$

A) $\dfrac{a+b}{4}$ B) $\dfrac{b^2}{a+b}$ C) $-b^2$ D) $-b$ E) -1

16. $x\neq 3,\ x^3-27=0\Rightarrow x^2+3x+17=?$

A) 8 B) 12 C) 15 D) 16 E) 21

Yanıtlar / *Answers*

1. A	4. E	7. E	10. C	13. E	16. A
2. E	5. C	8. A	11. C	14. E	
3. B	6. E	9. B	12. A	15. C	

1. $$\frac{x-4x^3}{4x^2-4x+1}\cdot\left(1-\frac{2}{2x+1}\right)$$

$$=\frac{x\cdot(1-4x^2)}{(2x-1)^2}\cdot\left(\frac{2x+1-2}{2x+1}\right)$$

$$=\frac{x(1-4x^2)}{(2x-1)^2}\cdot\frac{(2x-1)}{2x+1}$$

$$=\frac{x\cdot(1-2x)\cdot(1+2x)}{(2x-1)}\cdot\frac{1}{2x+1}=-x$$

Yanıt / Answer A

2. $$\frac{x-\frac{1}{x^2}}{x-\frac{1}{x}}:\frac{x^2+x+1}{x^2+x}=\frac{\frac{x^3-1}{x^2}}{\frac{x^2-1}{x}}\cdot\frac{x(x+1)}{x^2+x+1}$$

$$=\frac{(x^3-1)}{x\cdot(x^2-1)}\cdot\frac{x\cdot(x+1)}{x^2+x+1}$$

$$=\frac{(x-1)\cdot(x^2+x+1)}{x\cdot(x-1)\cdot(x+1)}\cdot\frac{x(x+1)}{x^2+x+1}$$

$$=1$$

Yanıt / Answer E

3. $$\frac{x^4-1}{x^2+1}:\frac{x+1}{4}=\frac{(x^2+1)\cdot(x^2-1)}{(x^2+1)}\cdot\frac{4}{(x+1)}$$

$$=(x-1)\cdot(x+1)\cdot\frac{4}{x+1}$$

$$=4\cdot(x-1)$$

Yanıt / Answer B

4. $$\frac{a}{b}+\frac{b}{a}=2$$

$$\frac{a^2+b^2}{ab}=2 \Rightarrow a^2-2ab+b^2=0$$

$$(a-b)^2=0 \Rightarrow a=b$$

$$\frac{a^4+b^4}{a^2b^2}=\frac{2a^4}{a^2\cdot a^2}=2$$

Yanıt / Answer E

5. $$\frac{\frac{2x+3}{x}}{4-\frac{9}{x^2}}\cdot(2x-3)=\frac{\frac{2x+3}{x}}{\frac{4x^2-9}{x^2}}\cdot(2x-3)$$

$$=\frac{(2x+3)\cdot x^2}{x\cdot(2x-3)\cdot(2x+3)}\cdot(2x-3)$$

$$=\frac{x^2}{x}=x$$

Yanıt / Answer C

6. $$\frac{a^3-8}{a^2-4}:\frac{a^2+2a+4}{a^2+4a+4}$$

$$=\frac{(a-2)\cdot(a^2+2a+4)}{(a-2)\cdot(a+2)}\cdot\frac{(a+2)^2}{a^2+2a+4}=a+2$$

Yanıt / Answer E

7. $$x^2-xy-12y^2=(x+3y)\cdot(x-4y)=0$$

$$x,\ y\in R^+ \Rightarrow x-4y=0 \Rightarrow x=4y$$

$$\frac{2x^2+4y^2}{x\cdot y}=\frac{2\cdot(4y)^2+4y^2}{4y\cdot y}$$

$$=\frac{32y^2+4y^2}{4y^2}=\frac{36y^2}{4y^2}=9$$

Yanıt / Answer E

8. $$\frac{x^2-xy+y^2}{x^3+y^3}:\frac{x}{x+y}$$

$$\frac{x^2-xy+y^2}{(x+y)\cdot(x^2-xy+y^2)}\cdot\frac{x+y}{x}=\frac{1}{x}$$

Yanıt / Answer A

9. $$\frac{x\cdot(y^2-9)+y(x^2-9)}{xy-9}=\frac{xy^2-9x+x^2y-9y}{xy-9}$$

$$=\frac{xy(y+x)-9(x+y)}{xy-9}$$

$$=\frac{(x+y)\cdot(xy-9)}{xy-9}=x+y$$

Yanıt / Answer B

10. $$2x-1-\frac{3x^2+2x-1}{x+1}=2x-1-\frac{(3x-1)\cdot(x+1)}{(x+1)}$$

$$=2x-1-3x+1=-x$$

Yanıt / Answer C

11. $$\frac{a^2-25}{a^2-3a-10}\cdot\frac{a^2+a-2}{a^2+6a+5}$$

$$=\frac{(a-5)\cdot(a+5)}{(a-5)\cdot(a+2)}\cdot\frac{(a+2)\cdot(a-1)}{(a+1)\cdot(a+5)}=\frac{a-1}{a+1}$$

Yanıt / Answer C

12. $$\left.\begin{array}{l} y>0 \\ y-x=6 \\ y+z=9 \\ xy-yz+xz=10 \end{array}\right\}\Rightarrow$$

$$(y-x)\cdot(y+z)=y^2+yz-xy-xz=54$$

$$\underline{+\quad xy-yz+xz=10}$$

$$y^2=64$$

$$y>0\ \Rightarrow\ y=8$$

$$\left.\begin{array}{l} y=8\ \Rightarrow x=2 \\ y=8\ \Rightarrow z=1 \end{array}\right\}\Rightarrow\ x+y+z=11$$

Yanıt / Answer A

13. $$6a^2+3a-6b^2-3b=6(a^2-b^2)+3(a-b)$$

$$=6(a-b)\cdot(a+b)+3(a-b)$$

$$=3(a-b)\cdot(2a+2b+1)$$

$$=3\cdot\frac{8}{3}\cdot\left(2\cdot\frac{11}{2}+1\right)=96$$

Yanıt / Answer E

14. $$\frac{a^3+b^3}{a-b}:\frac{a^3-a^2b+ab^2}{ab^2-a^2b}$$

$$=\frac{(a+b)\cdot(a^2-ab+b^2)}{a-b}\cdot\frac{ab(b-a)}{a(a^2-ab+b^2)}$$

$$=(a+b)\cdot(-b)$$

Yanıt / Answer E

15. $$\frac{\left(\frac{a}{b}-\frac{b}{a}\right)\cdot\left(1+\frac{2b}{a}+\frac{b^2}{a^2}\right)}{\left(\frac{1}{a^2}-\frac{1}{b^2}\right)\cdot\left(\frac{a}{b}+1\right)}:\frac{a+b}{a}$$

$$=\frac{\frac{a^2-b^2}{ab}\cdot\frac{a^2+2ab+b^2}{a^2}}{\frac{b^2-a^2}{a^2b^2}\cdot\frac{a+b}{b}}\cdot\frac{a}{a+b}$$

$$=\frac{\frac{(a-b)\cdot(a+b)\cdot(a+b)^2}{a^3b}}{\frac{(a+b)\cdot(b-a)\cdot(a+b)}{a^2b^3}}\cdot\frac{a}{a+b}$$

$$=\frac{(a-b)\cdot(a+b)\cdot b^2}{(b-a)\cdot a}\cdot\frac{a}{a+b}=-b^2$$

Yanıt / Answer C

16. $x^3-27=(x-3)\cdot(x^2+3x+9)=0$

$x\neq 3\Rightarrow x^2+3x+9=0$

$x^2+3x+17=(x^2+3x+9)+8=0+8=8$

Yanıt / Answer A

ORAN ve ORANTI
RATIO and PROPORTION

BÖLÜM
CHAPTER **2**

Oran ve Orantı / Ratio and Proportion

Test 1

1. $3a = 2b,\ 4b = 3c \Rightarrow \dfrac{a}{c} = ?$

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{2}{3}$ D) $\frac{3}{4}$ E) $\frac{1}{4}$

2. $\dfrac{a+b}{a} = \dfrac{5}{4} \Rightarrow \dfrac{a-2b}{b} = ?$

A) $\frac{1}{2}$ B) 1 C) $\frac{3}{2}$ D) 2 E) $\frac{5}{2}$

3. $\dfrac{5}{\sqrt{3}+1} = \dfrac{\sqrt{3}-1}{x} \Rightarrow x = ?$

A) $\frac{1}{3}$ B) $\frac{1}{4}$ C) $\frac{1}{5}$ D) $\frac{2}{3}$ E) $\frac{2}{5}$

4. $x : y : 24 = 3 : 5 : 6 \Rightarrow x + y = ?$

A) 24 B) 28 C) 30 D) 32 E) 34

5. $\dfrac{a}{c} = 3,\ \dfrac{c}{b} = 2 \Rightarrow \dfrac{a^2 + c^2}{4b^2} = ?$

A) 8 B) 10 C) 12 D) 14 E) 18

6. $\dfrac{a+3b}{a} = 5 \Rightarrow \dfrac{a+6b}{a-3b} = ?$

A) –5 B) –4 C) –3 D) 3 E) 5

7. $x, y, z \in R^+$

$\dfrac{x}{4} = \dfrac{y}{3} = \dfrac{z}{2}$

$x^2 - y \cdot z = 160 \Rightarrow x + y + z = ?$

A) 36 B) 38 C) 42 D) 45 E) 48

8. $x, y, z \in R^+$

$\dfrac{x}{3} = \dfrac{4}{y} = \dfrac{5}{z}$

$(x-2)\cdot(y-z) = 9 \Rightarrow x = ?$

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{1}{4}$ D) $\frac{1}{5}$ E) $\frac{1}{8}$

9. $\frac{a}{b}=\frac{b}{4}=\frac{c}{5} \Rightarrow \frac{\mathbf{b\cdot c}}{\mathbf{a}}=\mathbf{?}$

A) 2 B) $\frac{5}{2}$ C) 3 D) $\frac{7}{2}$ E) 5

10. $a+\frac{1}{b}=4,\ b+\frac{1}{a}=5 \Rightarrow \frac{\mathbf{2b+a}}{\mathbf{b-a}}=\mathbf{?}$

A) 10 B) 12 C) 14 D) 16 E) 18

11. $\frac{a-b}{a}=\frac{1}{3},\ \frac{b-c}{b}=\frac{2}{3} \Rightarrow \frac{\mathbf{c}}{\mathbf{a}}=\mathbf{?}$

A) $\frac{3}{7}$ B) $\frac{4}{7}$ C) $\frac{5}{7}$ D) $\frac{1}{9}$ E) $\frac{2}{9}$

12. $2a = 3b = 4c,$

$a + 2b - 3c = 15 \Rightarrow \mathbf{c = ?}$

A) 2 B) 3 C) 4 D) 7 E) 9

13. $a \in Z^+$

$\frac{a}{b}=\frac{2}{3},\ a^2+b^2=117 \Rightarrow \mathbf{(a-b)^3=?}$

A) –27 B) –8 C) –1 D) 8 E) 27

14. $\frac{x+2}{y-2}=k,$

$x=4 \Rightarrow y=3$

$y=5 \Rightarrow \mathbf{x=?}$

A) 14 B) 15 C) 16 D) 18 E) 20

15. $\frac{a}{3}=\frac{b}{5}=\frac{c}{6}$

$2a+3b-c=5 \Rightarrow \mathbf{a+c=?}$

A) 3 B) 4 C) 5 D) 6 E) 8

16. $a : b : c = 4 : (-3) : 2$

$2a + 4b - 3c = 20 \Rightarrow \mathbf{b + c = ?}$

A) –4 B) –2 C) 0 D) 2 E) 4

Yanıtlar / *Answers*

1. A	4. D	7. A	10. C	13. A	16. D
2. D	5. B	8. A	11. E	14. C	
3. E	6. C	9. E	12. E	15. A	

1. $3a=2b \Rightarrow \dfrac{a}{2}=\dfrac{b}{3}$

$4b=3c \Rightarrow \dfrac{b}{3}=\dfrac{c}{4}$

$$\left.\begin{array}{l} a=2k \\ b=3k \\ c=4k \end{array}\right\} \Rightarrow \frac{a}{c}=\frac{2k}{4k}=\frac{1}{2}$$

Yanıt / Answer A

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2. $\dfrac{a+b}{a}=\dfrac{5}{4} \Rightarrow 4a+4b=5a$

$4b=a$

$\dfrac{a-2b}{b}=\dfrac{4b-2b}{b}=\dfrac{2b}{b}=2$

Yanıt / Answer D

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3. $\dfrac{5}{\sqrt{3}+1}=\dfrac{\sqrt{3}-1}{x} \Rightarrow 5\cdot x=(\sqrt{3}+1)\cdot(\sqrt{3}-1)$

$5\cdot x=3-1$

$5\cdot x=2 \Rightarrow x=\dfrac{2}{5}$

Yanıt / Answer E

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4. $x:y:24=3:5:6$

$\dfrac{x}{3}=\dfrac{y}{5}=\dfrac{24}{6} \Rightarrow x=3\cdot 4=12$

$y=5\cdot 4=20$

$\Rightarrow x+y=12+20=32$

Yanıt / Answer D

5.
$$\left.\begin{array}{l} \dfrac{a}{c}=3 \Rightarrow a=3c \\ \dfrac{c}{b}=2 \Rightarrow b=\dfrac{c}{2} \end{array}\right] \Rightarrow \frac{a^2+c^2}{4b^2}=\frac{(3c)^2+c^2}{4\cdot\left(\dfrac{c}{2}\right)^2}$$

$$=\frac{10c^2}{c^2}=10$$

Yanıt / Answer B

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6. $\dfrac{a+3b}{a}=5 \Rightarrow \begin{cases} a+3b=5a \\ 3b=4a \Rightarrow b=4k,\ a=3k \end{cases}$

$\dfrac{a+6b}{a-3b}=\dfrac{3k+6\cdot(4k)}{3k-3\cdot(4k)}=\dfrac{27k}{-9k}=-3$

Yanıt / Answer C

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7. $\dfrac{x}{4}=\dfrac{y}{3}=\dfrac{z}{2}=k \Rightarrow \begin{cases} x=4k \\ y=3k \\ z=2k \end{cases}$

$x^2-y\cdot z=(4k)^2-(3k)\cdot(2k)=160$

$16k^2-6k^2=160$

$10k^2=160$

$k^2=16 \Rightarrow k=4$

$x+y+z=4k+3k+2k=9k=9\cdot 4=36$

Yanıt / Answer A

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8. $\dfrac{x}{3}=\dfrac{4}{y}=\dfrac{5}{z} \Rightarrow x=3k,\ \ y=\dfrac{4}{k},\ z=\dfrac{5}{k}$

$\Rightarrow (x-2)\cdot(y-z)=(3k-2)\cdot\left(\dfrac{4}{k}-\dfrac{5}{k}\right)=9$

$=(3k-2)\cdot\left(-\dfrac{1}{k}\right)=9=3k-2=-9k$

$12k=2 \Rightarrow k=\dfrac{1}{6}$

$x=3\cdot k \Rightarrow x=3\cdot\dfrac{1}{6}=\dfrac{1}{2}$

Yanıt / Answer A

9. $\frac{a}{b}=\frac{b}{4}=\frac{c}{5}=k \Rightarrow \begin{cases} b=4k \\ c=5k \\ a=bk=4k^2 \end{cases}$

$\Rightarrow \frac{b\cdot c}{a}=\frac{4k\cdot 5k}{4k^2}=5$

Yanıt / Answer E

10. $a+\frac{1}{b}=4 \Rightarrow \frac{a\cdot b+1}{b}=4 \Rightarrow a\cdot b+1=4b$

$b+\frac{1}{a}=5 \Rightarrow \frac{ab+1}{a}=5 \Rightarrow a\cdot b+1=5a$

$\Rightarrow 4b=5a \Rightarrow b=5k,\ a=4k$

$\frac{2b+a}{b-a}=\frac{2\cdot(5k)+4k}{5k-4k}=\frac{14k}{k}=14$

Yanıt / Answer C

11. $\frac{a-b}{a}=\frac{1}{3} \Rightarrow 3a-3b=a$

$2a=3b$

$\frac{b-c}{b}=\frac{2}{3} \Rightarrow 3b-3c=2b$

$b=3c$

$2a=3b=3\cdot(3c)$

$2a=9c \Rightarrow \frac{c}{a}=\frac{2}{9}$

Yanıt / Answer E

12. $2a = 3b = 4c$

$a = 6k,\quad b = 4k,\quad c = 3k$

$a + 2b - 3c = 15 \Rightarrow 6k + 2\cdot(4k) - 3\cdot(3k) = 15$

$6k + 8k - 9k = 15$

$5k = 15 \Rightarrow k = 3$

$\Rightarrow c = 3\cdot k = 3\cdot 3 = 9$

Yanıt / Answer E

13. $\frac{a}{b}=\frac{2}{3} \Rightarrow a=2k,\ b=3k$

$a^2+b^2=(2k)^2+(3k)^2=117$

$4k^2+9k^2=117$

$13k^2=117$

$k^2=9$

$k=3$

$(a-b)^3=(2k-3k)^3$

$=(-k)^3=(-3)^3=-27$

Yanıt / Answer A

14. $\frac{x+2}{y-2}=k$

$x=4 \Rightarrow y=3$

$\frac{4+2}{3-2}=k \Rightarrow k=6$

$\frac{x+2}{y-2}=6$

$y=5 \Rightarrow \frac{x+2}{5-2}=6 \Rightarrow x+2=18$

$x=16$

Yanıt / Answer C

15. $\frac{a}{3}=\frac{b}{5}=\frac{c}{6}=k$

$\Rightarrow \frac{2a+3b-c}{2\cdot 3+3\cdot 5-6}=k$

$\frac{5}{15}=k=\frac{1}{3}$

$a+c=3k+6k=9k$

$a+c=9\cdot\frac{1}{3}=3$

Yanıt / Answer A

16. $a : b : c = 4 : (-3) : 2 \Rightarrow a = 4k,\quad b = -3k,\quad c = 2k$

$2a + 4b - 3c = 2\cdot(4k) + 4\cdot(-3k) - 3\cdot(2k) = 20$

$= -10k = 20 \Rightarrow k = -2$

$b + c = -3k + 2k = -k = -(-2) = 2$

Yanıt / Answer D

1. $\dfrac{a}{b}=\dfrac{c}{d}=\dfrac{3}{2} \Rightarrow \mathbf{\dfrac{2b+3d}{2a+3c}=?}$

A) $\dfrac{1}{2}$ B) $\dfrac{2}{3}$ C) $\dfrac{3}{2}$ D) $\dfrac{5}{3}$ E) $\dfrac{3}{5}$

2. $\dfrac{x}{y}=\dfrac{3}{4} \Rightarrow \mathbf{\dfrac{x+y}{y-x}=?}$

A) 4 B) 5 C) 6 D) 7 E) 8

3. $x, y \in N^{+}$,

$\dfrac{x}{3}=\dfrac{y}{5}=\dfrac{8}{x+y} \Rightarrow \mathbf{x+y=?}$

A) 4 B) 6 C) 8 D) 12 E) 16

4. $\left.\begin{array}{l}\dfrac{2}{x}=\dfrac{y}{3}\\ x+y=5\end{array}\right\} \Rightarrow \mathbf{x^2+y^2=?}$

A) 12 B) 13 C) 15 D) 19 E) 25

5. $\left.\begin{array}{l}\dfrac{x-y}{3}=\dfrac{x+y}{4}=\dfrac{z+x}{5}\\ x-z=20\end{array}\right\} \Rightarrow \mathbf{z+2y=?}$

A) 10 B) 15 C) 16 D) 20 E) 25

6. $3x=4y=5z$

$2x-3y+z=14$

$\Rightarrow \mathbf{y=?}$

A) 15 B) 25 C) 30 D) 40 E) 45

7. $x, y, z \in N^{+}$

$\left.\begin{array}{l}\dfrac{x}{3}=\dfrac{y}{4}\\ x+y+z=53\end{array}\right\} \Rightarrow \mathbf{\min(z)=?}$

A) 3 B) 4 C) 5 D) 6 E) 7

8. $\left.\begin{array}{l}\dfrac{x}{y}=\dfrac{3}{4}\\ \dfrac{y}{z}=\dfrac{2}{5}\\ x+y+z=34\end{array}\right\} \Rightarrow \mathbf{z=?}$

A) 5 B) 10 C) 15 D) 20 E) 25

9. $\frac{x+y}{2x}=\frac{2y}{x+y} \Rightarrow \mathbf{\frac{3x-y}{2x+y}=?}$

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{2}{3}$ D) $\frac{1}{4}$ E) $\frac{3}{4}$

10. $x:y:z=1:2:3 \quad \Rightarrow \quad \mathbf{\frac{3x-y}{y+z}=?}$

A) $\frac{1}{5}$ B) $\frac{2}{5}$ C) $\frac{3}{5}$ D) $\frac{4}{5}$ E) 1

11. $x:y:5=3:2:6 \quad \Rightarrow \quad \mathbf{6(x+y)=?}$

A) 5 B) 10 C) 15 D) 20 E) 25

12. $\left.\begin{matrix} x+x^2=\frac{2}{3} \\ xy+y=\frac{4}{5} \end{matrix}\right\} \Rightarrow \mathbf{\frac{y}{x}=?}$

A) $\frac{5}{6}$ B) $\frac{6}{5}$ C) $\frac{4}{5}$ D) $\frac{5}{4}$ E) $\frac{3}{4}$

13. $\frac{3^a}{9^a}=\frac{27^a}{x} \quad \Rightarrow \quad \mathbf{x=?}$

A) 3^{-2a} B) 3^{-4a} C) 3^a D) 3^{2a} E) 3^{4a}

14. $\left.\begin{matrix} \frac{x}{0{,}2}=\frac{y}{0{,}4}=\frac{z}{0{,}5} \\ x+y+z=44 \end{matrix}\right\} \Rightarrow \mathbf{x=?}$

A) 5 B) 6 C) 7 D) 8 E) 9

15. $\frac{3x^2-4xy+3y^2}{x^2+y^2}=1 \quad \Rightarrow \quad \mathbf{\frac{x}{y}=?}$

A) $\frac{1}{2}$ B) 1 C) $\frac{3}{2}$ D) 2 E) $\frac{5}{2}$

16. $\left.\begin{matrix} \frac{a+2b}{b}=\frac{5}{2} \\ \frac{2b-c}{b}=\frac{1}{3} \end{matrix}\right\} \Rightarrow \mathbf{\frac{5a}{c}=?}$

A) $\frac{3}{4}$ B) $\frac{2}{5}$ C) $\frac{3}{2}$ D) $\frac{4}{5}$ E) 1

Yanıtlar / *Answers*

1. B	4. B	7. B	10. A	13. E	16. C
2. D	5. E	8. D	11. E	14. D	
3. C	6. C	9. C	12. B	15. B	

1. $$\frac{a}{b}=\frac{c}{d}=\frac{3}{2} \Rightarrow \frac{2a}{2b}=\frac{3c}{3d}=\frac{3}{2}$$

$$\Rightarrow \frac{2a+3c}{2b+3d}=\frac{3}{2} \Rightarrow \frac{2b+3d}{2a+3c}=\frac{2}{3}$$

Yanıt / Answer B

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2. $$\frac{x}{y}=\frac{3}{4} \Rightarrow \begin{cases} x=3k \\ y=4k \end{cases}$$

$$\frac{x+y}{y-x}=\frac{3k+4k}{4k-3k}=\frac{7k}{k}=7$$

Yanıt / Answer D

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3. $$\frac{x}{3}=\frac{y}{5}=\frac{8}{x+y} \Rightarrow \frac{x+y}{3+5}=\frac{8}{x+y}$$

$$(x+y)^2=8^2$$

$$x,y \in N^+ \Rightarrow x+y=8$$

Yanıt / Answer C

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4. $$\frac{2}{x}=\frac{y}{3} \Rightarrow x \cdot y=6$$

$$x^2+y^2=(x+y)^2-2xy$$

$$=5^2-2 \cdot 6$$

$$=25-12=13$$

Yanıt / Answer B

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5. $$\left.\begin{array}{l} x-y=3k \\ x+y=4k \end{array}\right\} \Rightarrow x=\frac{7k}{2},\ y=\frac{k}{2}$$

$$z+x=5k \Rightarrow z=\frac{3k}{2}$$

$$x-z=\frac{7k}{2}-\frac{3k}{2}=20 \Rightarrow k=10$$

$$z+2y=\frac{3k}{2}+\frac{2k}{2}=\frac{5k}{2}=10 \cdot \frac{5}{2}=25$$

Yanıt / Answer E

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6. $3x = 4y = 5z \Rightarrow x = 20k,\ y = 15k,\ z = 12k$

$2x - 3y + z = 2 \cdot (20k) - 3 \cdot (15k) + 12k = 14$

$7k = 14 \Rightarrow k = 2$

$y = 15k = 15 \cdot 2 = 30$

Yanıt / Answer C

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7. $$\left.\begin{array}{l} x=3k \\ y=4k \end{array}\right\} \Rightarrow x+y+z=53$$

$$z+7k=53$$

$$z=53-7k$$

$$k=7 \Rightarrow \min(z)=53-7 \cdot 7=53-49=4$$

Yanıt / Answer B

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8. $$\left.\begin{array}{l} \dfrac{x}{y}=\dfrac{3}{4} \\ \dfrac{y}{z}=\dfrac{2}{5}=\dfrac{4}{10} \end{array}\right\} \Rightarrow x=3k,\ y=4k,\ z=10k$$

$$x+y+z=17k=34 \Rightarrow k=2$$

$$z=10 \cdot k \Rightarrow 10 \cdot 2=20$$

Yanıt / Answer D

9. $\frac{x+y}{2x}=\frac{2y}{x+y} \Rightarrow (x+y)^2=4xy$

$$(x+y)^2-4xy=0$$

$$(x-y)^2=0$$

$$x=y$$

$$\Rightarrow \frac{3x-y}{2x+y}=\frac{3x-x}{2x+x}=\frac{2x}{3x}=\frac{2}{3}$$

Yanıt / Answer C

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10. $x:y:z=1:2:3$

$\Rightarrow x=k,\ y=2k,\ z=3k$

$$\frac{3x-y}{y+z}=\frac{3k-2k}{2k+3k}=\frac{k}{5k}=\frac{1}{5}$$

Yanıt / Answer A

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11. $x:y:5=3:2:6$

$\Rightarrow \frac{x}{3}=\frac{y}{2}=\frac{5}{6}$

$x=\frac{15}{6}\ ,\ y=\frac{10}{6}$

$\Rightarrow 6(x+y)=6\cdot\left(\frac{15}{6}+\frac{10}{6}\right)=25$

Yanıt / Answer E

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12. $x+x^2=\frac{2}{3} \Rightarrow x\cdot(1+x)=\frac{2}{3}$

$$y(x+1)=\frac{4}{5}$$

$$\frac{x}{y}=\frac{2}{3}\cdot\frac{5}{4}$$

$$\frac{x}{y}=\frac{5}{6} \Rightarrow \frac{y}{x}=\frac{6}{5}$$

Yanıt / Answer B

---

13. $\frac{3^a}{9^a}=\frac{27^a}{x} \Rightarrow x\cdot 3^a=27^a\cdot 9^a$

$$x\cdot 3^a=3^{3a}\cdot 3^{2a}$$

$$x\cdot 3^a=3^{5a}$$

$$x=3^{4a}$$

Yanıt / Answer E

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14. $\frac{x}{0{,}2}=\frac{y}{0{,}4}=\frac{z}{0{,}5}=k \Rightarrow \begin{cases} x=0{,}2\cdot k \\ y=0{,}4\cdot k \\ z=0{,}5\cdot k \end{cases}$

$\Rightarrow x+y+z=1{,}1k=44 \Rightarrow k=\frac{44}{1{,}1}=40$

$x=0{,}2\cdot k=0{,}2\cdot 40=8$

Yanıt / Answer D

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15. $\frac{3x^2-4xy+3y^2}{x^2+y^2}=1$

$3x^2-4xy+3y^2=x^2+y^2$

$2x^2-4xy+2y^2=0$

$2(x-y)^2=0 \Rightarrow x=y$

$\Rightarrow \frac{x}{y}=\frac{x}{x}=1$

Yanıt / Answer B

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16. $\frac{a+2b}{b}=\frac{5}{2} \Rightarrow 2a+4b=5b$

$$2a=b \Rightarrow a=\frac{b}{2}$$

$\frac{2b-c}{b}=\frac{1}{3} \Rightarrow 6b-3c=b$

$$5b=3c \Rightarrow c=\frac{5b}{3}$$

$$\Rightarrow \frac{5a}{c}=\frac{5\cdot\frac{b}{2}}{\frac{5b}{3}}=\frac{3}{2}$$

Yanıt / Answer C

1. $$\left.\begin{aligned}&\frac{a}{b}=\frac{3}{5}\\&\frac{b}{c}=\frac{7}{3}\\&a+b+c=355\end{aligned}\right\}\Rightarrow a=?$$

A) 75 B) 100 C) 105 D) 115 E) 125

2. $$\left.\begin{aligned}&\frac{a+3b}{b}=3{,}2\\&\frac{b-2c}{c}=0{,}5\end{aligned}\right\}\Rightarrow \frac{2c-a}{b}=?$$

A) $\frac{1}{5}$ B) $\frac{2}{5}$ C) $\frac{3}{5}$ D) $\frac{4}{5}$ E) 1

3. $$\left.\begin{aligned}&a:b:c=3:4:5\\&4a-2b+\frac{c}{5}=75\end{aligned}\right\}\Rightarrow b=?$$

A) 30 B) 45 C) 50 D) 60 E) 75

4. $$(4a-3b)^2+(2b-c)^2=0 \Rightarrow \frac{a-4b+3c}{a+2c}=?$$

A) $\frac{11}{19}$ B) $\frac{13}{19}$ C) $\frac{15}{19}$ D) $\frac{11}{17}$ E) $\frac{13}{17}$

5. $$\frac{a}{b}=\frac{c}{d}=\frac{2}{3} \Rightarrow \frac{b+d}{a+c}\cdot\frac{a-3c}{b-3d}=?$$

A) 1 B) 2 C) 3 D) 4 E) 5

6. $$\frac{x+y}{x}=\frac{x+z}{y}=\frac{y+z}{z}=k \Rightarrow k=?$$

A) 1 B) 2 C) 3 D) 4 E) 5

7. $$\left.\begin{aligned}&\frac{x}{3}=\frac{y}{4}=\frac{z}{5}=k\\&\frac{5x+2y-4z}{2m-13}=k\end{aligned}\right\}\Rightarrow m=?$$

A) 4 B) 5 C) 6 D) 7 E) 8

8. $$\left.\begin{aligned}&\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=2\\&4a-3c+2e=48\\&4b+2f=60\end{aligned}\right\}\Rightarrow c=?$$

A) 8 B) 12 C) 16 D) 18 E) 24

9. $\frac{a \cdot b}{2} = \frac{b \cdot c}{3} = \frac{c \cdot a}{6} \Rightarrow \frac{a^2+b^2+c^2}{a \cdot b} = ?$

A) 5 B) 6 C) 7 D) 8 E) 9

10. $\left.\begin{array}{l} \frac{x \cdot y}{z} = 4 \\ \frac{y \cdot z}{x} = 3 \\ \frac{x \cdot z}{y} = 2 \end{array}\right\} \Rightarrow x^2+y^2+z^2 = ?$

A) 20 B) 24 C) 26 D) 28 E) 32

11. $\frac{x+y}{9} = \frac{x-z}{3} = \frac{z-y}{4} \Rightarrow \frac{x}{y} = ?$

A) $\frac{1}{4}$ B) $\frac{1}{8}$ C) $\frac{1}{16}$ D) 8 E) 16

12. $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = 4 \Rightarrow \left(\frac{a-b}{b}\right) \cdot \left(\frac{c+d}{d}\right) \cdot \left(\frac{f}{f-e}\right) = ?$

A) –10 B) –5 C) 1 D) 5 E) 10

13. $\frac{x-y}{x+y} = \frac{2}{3} \Rightarrow \frac{x^2+y^2}{x^2-y^2} = ?$

A) $\frac{9}{4}$ B) $\frac{4}{9}$ C) $\frac{13}{12}$ D) $\frac{12}{13}$ E) $\frac{13}{6}$

14. $\left.\begin{array}{l} \frac{a}{b} = \frac{c}{d} = k \\ \frac{4a+y \cdot c}{x \cdot b+3 \cdot d} = k \end{array}\right\} \Rightarrow x+y = ?$

A) 3 B) 4 C) 5 D) 6 E) 7

15. $3xy = 4yz = 5xz \Rightarrow \frac{x+y}{y+z} = ?$

A) $\frac{9}{8}$ B) $\frac{7}{8}$ C) $\frac{5}{8}$ D) $\frac{9}{7}$ E) $\frac{9}{5}$

16. $\left.\begin{array}{l} \frac{1}{x} - 3 = y \\ \frac{1}{y} - 5 = x \end{array}\right\} \Rightarrow \frac{x+y}{x-y} = ?$

A) 1 B) $\frac{1}{8}$ C) $\frac{3}{5}$

D) 4 E) 5

[YILDIZ TEKNİK ÜNV. YÖS 2013]

Yanıtlar / *Answers*

1. C	4. A	7. E	10. C	13. C	16. D
2. C	5. A	8. E	11. D	14. E	
3. D	6. B	9. C	12. B	15. A	

1. $$\left.\begin{aligned}\frac{a}{b}=\frac{3}{5}=\frac{21}{35}\\ \frac{b}{c}=\frac{7}{3}=\frac{35}{15}\end{aligned}\right\}\Rightarrow a=21\cdot k,\ b=35\cdot k,\ c=15\cdot k$$

$a+b+c=71\cdot k=355\Rightarrow k=5$

$a=21\cdot k=21\cdot 5=105$

Yanıt / Answer C

2. $\dfrac{a+3b}{b}=\dfrac{32}{10}=\dfrac{16}{5}$

$\Rightarrow 5a+15b=16b$

$5a=b\Rightarrow a=\dfrac{b}{5}$

$\dfrac{b-2c}{c}=\dfrac{1}{2}\Rightarrow 2b-4c=c$

$2b=5c\Rightarrow c=\dfrac{2b}{5}$

$$\frac{2c-a}{b}=\frac{2\cdot\left(\frac{2b}{5}\right)-\frac{b}{5}}{b}=\frac{3}{5}$$

Yanıt / Answer C

3. $a:b:c=3:4:5$

$\Rightarrow a=3k,\ b=4k,\ c=5k$

$4a-2b+\dfrac{c}{5}=75$

$4\cdot(3k)-2\cdot(4k)+\dfrac{5k}{5}=75$

$12k-8k+k=75\Rightarrow k=15$

$b=4\cdot k\Rightarrow 4\cdot 15=60$

Yanıt / Answer D

4. $(4a-3b)^2+(2b-c)^2=0$

$4a-3b=0\Rightarrow 4a=3b$

$a=3k,\ b=4k$

$2b-c=0\Rightarrow c=2b,\ c=8k$

$$\frac{a-4b+3c}{a+2c}=\frac{3k-4\cdot 4k+3\cdot 8k}{3k+2\cdot 8k}=\frac{11k}{19k}=\frac{11}{19}$$

Yanıt / Answer A

5. $\dfrac{a}{b}=\dfrac{c}{d}=\dfrac{a+c}{b+d}=\dfrac{2}{3}\Rightarrow\dfrac{b+d}{a+c}=\dfrac{3}{2}$

$\dfrac{a}{b}=\dfrac{-3c}{-3d}=\dfrac{a-3c}{b-3d}=\dfrac{2}{3}$

$\Rightarrow\dfrac{b+d}{a+c}\cdot\dfrac{a-3c}{b-3d}=\dfrac{3}{2}\cdot\dfrac{2}{3}=1$

Yanıt / Answer A

6. $\dfrac{x+y}{x}=\dfrac{x+z}{y}=\dfrac{y+z}{z}=k$

$\dfrac{x+y+x+z+y+z}{x+y+z}=k$

$\dfrac{2\cdot(x+y+z)}{x+y+z}=k$

$k=2$

Yanıt / Answer B

7. $\dfrac{x}{3}=\dfrac{y}{4}=\dfrac{z}{5}=k$

$\Rightarrow\dfrac{5x}{15}=\dfrac{2y}{8}=\dfrac{-4z}{-20}=k$

$\dfrac{5x+2y-4z}{15+8-20}=k\Rightarrow 2m-13=3$

$2m=16$

$m=8$

Yanıt / Answer E

8. $\dfrac{a}{b}=\dfrac{c}{d}=\dfrac{e}{f}=2$

$\Rightarrow\dfrac{4a-3c+2e}{4b-3d+2f}=2$

$\dfrac{48}{60-3d}=2\Rightarrow 24=60-3d$

$3d=36\Rightarrow d=12$

$\dfrac{c}{d}=2\Rightarrow c=2\cdot d=2\cdot 12=24$

Yanıt / Answer E

9. $$\left.\begin{matrix} a\cdot b=2k \\ b\cdot c=3k \end{matrix}\right\rangle \Rightarrow \frac{ab}{bc}=\frac{2}{3}=\frac{a}{c} \Rightarrow a=2k,\ c=3k$$

$$\left.\begin{matrix} b\cdot c=3k \\ c\cdot a=6k \end{matrix}\right\rangle \Rightarrow \frac{bc}{ca}=\frac{3k}{6k} \Rightarrow a=2k\ ,\ b=k$$

$$\Rightarrow \frac{a^2+b^2+c^2}{a\cdot b}=\frac{4k^2+k^2+9k^2}{2k^2}=7$$

Yanıt / Answer C

10. $$\left.\begin{matrix} \left(\frac{x\cdot y}{z}\right)\cdot\left(\frac{y\cdot z}{x}\right)=4\cdot 3 \Rightarrow y^2=12 \\ \left(\frac{y\cdot z}{x}\right)\cdot\left(\frac{x\cdot z}{y}\right)=3\cdot 2 \Rightarrow z^2=6 \\ \left(\frac{x\cdot y}{z}\right)\cdot\left(\frac{x\cdot z}{y}\right)=4\cdot 2 \Rightarrow x^2=8 \end{matrix}\right\}$$

$$\Rightarrow x^2+y^2+z^2=8+12+6=26$$

Yanıt / Answer C

11. $$\begin{array}{l} x+y=9k \\ x-z=3k \\ \underline{+\quad z-y=4k} \\ 2x=16k \ \Rightarrow\ x=8k \end{array}$$

$$x+y=9k \ \Rightarrow\ 8k+y=9k$$

$$y=k$$

$$\frac{x}{y}=\frac{8k}{k}=8$$

Yanıt / Answer D

12. $$\frac{a}{b}=4 \Rightarrow a=4b$$

$$\frac{c}{d}=4 \Rightarrow c=4d$$

$$\frac{e}{f}=4 \Rightarrow e=4f$$

$$\Rightarrow \left(\frac{a-b}{b}\right)\cdot\left(\frac{c+d}{d}\right)\cdot\left(\frac{f}{f-e}\right)$$

$$=\left(\frac{4b-b}{b}\right)\cdot\left(\frac{4d+d}{d}\right)\cdot\left(\frac{f}{f-4f}\right)$$

$$=3\cdot 5\cdot\frac{1}{-3}=-5$$

Yanıt / Answer B

13. $$\frac{x-y}{x+y}=\frac{2}{3} \Rightarrow 3x-3y=2x+2y$$

$$x=5y$$

$$\frac{x^2+y^2}{x^2-y^2}=\frac{(5y)^2+y^2}{(5y)^2-y^2}=\frac{26y^2}{24y^2}=\frac{13}{12}$$

Yanıt / Answer C

14. $$\frac{4a}{4b}=\frac{3c}{3d}=k \Rightarrow \frac{4a+3c}{4b+3d}=k$$

$$x\cdot b=4b \qquad y\cdot c=3\cdot c$$

$$x=4 \qquad y=3$$

$$x+y=4+3=7$$

Yanıt / Answer E

15. $$3\cdot x\cdot y=4\cdot y\cdot z=5\cdot x\cdot z$$

$$z=3k\ ,\ x=4k\ ,\ y=5k$$

$$\Rightarrow \frac{x+y}{y+z}=\frac{4k+5k}{5k+3k}=\frac{9k}{8k}=\frac{9}{8}$$

Yanıt / Answer A

16. $$\frac{1}{x}-3=y \ \Rightarrow\ \frac{1-xy}{x}=3$$

$$\frac{1}{y}-5=x \ \Rightarrow\ \frac{1-xy}{y}=5$$

$$\frac{\frac{1-xy}{x}}{\frac{1-xy}{y}}=\frac{y}{x}=\frac{3}{5} \Rightarrow \frac{x+y}{x-y}=\frac{8}{2}=4$$

Yanıt / Answer D

1. $\frac{x+y}{x}=5 \Rightarrow \frac{2x+y}{y-2x}=?$

A) 1 B) 2 C) 3 D) 4 E) 5

2. $\left.\begin{array}{l}\frac{x}{2}=\frac{y}{3}=\frac{z}{4}\\ x+3y-2z=42\end{array}\right\} \Rightarrow x=?$

A) 14 B) 18 C) 21 D) 28 E) 35

3. $\left.\begin{array}{l}x-\frac{2}{y}=5\\ y-\frac{2}{x}=3\end{array}\right\} \Rightarrow \frac{2y-x}{x}=?$

A) $\frac{1}{5}$ B) $\frac{2}{5}$ C) $\frac{3}{5}$ D) $\frac{4}{5}$ E) 1

4. $\left.\begin{array}{l}\frac{x}{3}=\frac{y}{-4}=\frac{z}{6}\\ 3x-y+z=38\end{array}\right\} \Rightarrow x+y+z=?$

A) 8 B) 9 C) 10 D) 12 E) 13

5. $k\in N^{+}$

$\left.\begin{array}{l}\frac{x}{9}=\frac{y}{16}=k^{2}\\ 2\sqrt{x}-\sqrt{y}=4\end{array}\right\} \Rightarrow x=?$

A) 9 B) 18 C) 24 D) 36 E) 48

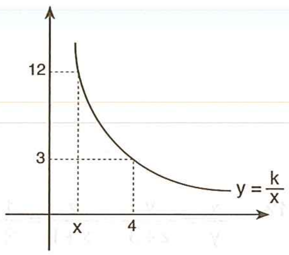
6. $\frac{2}{4^{2-a}}=\frac{16^{\frac{a}{2}}}{x} \Rightarrow x=?$

A) 2 B) 4 C) 8 D) 16 E) 32

7. $\left.\begin{array}{l}2x=3y=4z\\ \frac{1}{x}+\frac{1}{y}+\frac{1}{z}=3\end{array}\right\} \Rightarrow z=?$

A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) $\frac{3}{4}$ D) $\frac{4}{3}$ E) 2

8. **x = ?**



A) $\frac{1}{2}$ B) 1 C) $\frac{3}{2}$ D) 2 E) $\frac{5}{2}$

9. $x, y, z \in R^{+}$

$$\left.\begin{array}{l}\dfrac{x}{2}=\dfrac{y}{3}=3z\\ x^{2}+y^{2}+9z^{2}=56\end{array}\right\} \Rightarrow \mathbf{y=?}$$

A) 2 B) 4 C) 5 D) 6 E) 8

10.

$$\left.\begin{array}{l}\dfrac{x-y}{2}=\dfrac{x-z}{3}=\dfrac{9}{a}\\ y-z=3\end{array}\right\} \Rightarrow \mathbf{a=?}$$

A) 3 B) 9 C) 12 D) 15 E) 18

11.

$$\left.\begin{array}{l}ax=by=cz=32\\ x+y+z=8\end{array}\right\} \Rightarrow \mathbf{\frac{1}{a}+\frac{1}{b}+\frac{1}{c}=?}$$

A) $\frac{1}{2}$ B) $\frac{1}{4}$ C) $\frac{1}{6}$ D) $\frac{3}{4}$ E) $\frac{5}{6}$

12. $\dfrac{x}{y}=\dfrac{y}{z+3}=\dfrac{z}{x+1}=\dfrac{1}{2} \Rightarrow \mathbf{x+y+z=?}$

A) 2 B) 3 C) 4 D) 5 E) 6

13.

$$\left.\begin{array}{l}x=\dfrac{y}{2}=\dfrac{z}{3}\\ x\cdot y+y\cdot z+z\cdot x=22\\ x,y,z\in R^{+}\end{array}\right\} \Rightarrow \mathbf{y\cdot z=?}$$

A) 8 B) 10 C) 12 D) 18 E) 24

14.

$$\left.\begin{array}{l}\dfrac{x}{3}=\dfrac{y}{5}=\dfrac{z}{7}\\ 2x+3y=42\end{array}\right\} \Rightarrow \mathbf{z=?}$$

A) 7 B) 10 C) 12 D) 14 E) 15

15.

$$\left.\begin{array}{l}\dfrac{a}{b}=\dfrac{c}{d}=\dfrac{e}{f}=\dfrac{1}{3}\\ 3b-d+f=18\\ e-c=3\end{array}\right\} \Rightarrow \mathbf{a=?}$$

A) 1 B) 2 C) 3 D) 4 E) 5

16. $\dfrac{a}{b}=\dfrac{c}{d}=\dfrac{e}{f}=\dfrac{1}{5}$

$2a-3c+5e=-8$

$2b+5f=35$

$\Rightarrow \mathbf{d=?}$

A) –25 B) –5 C) 1 D) 5 E) 25

[İSTANBUL ÜNV. YÖS 2013]

Yanıtlar / *Answers*

1. C	4. C	7. C	10. A	13. C	16. E
2. D	5. D	8. B	11. B	14. D	
3. A	6. C	9. D	12. C	15. A	

1. $\frac{x+y}{x}=5 \Rightarrow \begin{cases} x+y=5x \\ y=4x \end{cases}$

$\frac{2x+y}{y-2x}=\frac{2x+4x}{4x-2x}=\frac{6x}{2x}=3$

Yanıt / Answer C

---

2. $\frac{x}{2}=\frac{y}{3}=\frac{z}{4}=k \Rightarrow x=2k\,, y=3k\,,\ z=4k$

$\Rightarrow x+3y-2z=42$

$2k+3\cdot(3k)-2\cdot(4k)=42$

$3k=42$

$k=14$

$x = 2\cdot k = 2\cdot 14 = 28$

Yanıt / Answer D

---

3. $x-\frac{2}{y}=5 \Rightarrow xy-2=5y$

$y-\frac{2}{x}=3 \Rightarrow xy-2=3x$

$5y=3x \Rightarrow x=5k$

$y=3k$

$\frac{2y-x}{x}=\frac{2\cdot(3k)-5k}{5k}=\frac{k}{5k}=\frac{1}{5}$

Yanıt / Answer A

---

4. $\frac{x}{3}=\frac{y}{-4}=\frac{z}{6}=k \Rightarrow x=3k\ ,\ y=-4k\ ,\ z=6k$

$3x - y + z = 3\cdot(3k) - (-4k) + 6k = 38$

$19k = 38$

$k = 2$

$x + y + z = 3k - 4k + 6k = 5k$

$= 5\cdot 2 = 10$

Yanıt / Answer C

---

5. $x=9k^2$

$y=16k^2$

$2\sqrt{x}-\sqrt{y}=2\cdot\sqrt{9k^2}-\sqrt{16k^2}$

$4=6k-4k$

$4=2k \Rightarrow k=2$

$x=9k^2=9\cdot(2)^2=9\cdot 4=36$

Yanıt / Answer D

---

6. $\frac{2}{(2^2)^{2-a}}=\frac{(2^4)^{\frac{a}{2}}}{x} \Rightarrow$

$2\cdot x=2^{2a}\cdot 2^{4-2a}$

$2\cdot x=2^4$

$x=2^3 \Rightarrow x=8$

Yanıt / Answer C

---

7. $2x=3y=4z=k$

$\Rightarrow x=\frac{k}{2}\ , y=\frac{k}{3}\ , z=\frac{k}{4}$

$\frac{1}{x}+\frac{1}{y}+\frac{1}{z}=\frac{1}{\frac{k}{2}}+\frac{1}{\frac{k}{3}}+\frac{1}{\frac{k}{4}}=3$

$\frac{9}{k}=3 \Rightarrow k=3$

$z=\frac{k}{4}=\frac{3}{4}$

Yanıt / Answer C

---

8. $\left.\begin{matrix} x=4 \\ y=3 \end{matrix}\right\} \Rightarrow 3=\frac{k}{4} \Rightarrow k=12$

$y=12 \Rightarrow 12=\frac{12}{x} \Rightarrow x=1$

Yanıt / Answer B

9. $\frac{x}{2}=\frac{y}{3}=3z=k$

$\Rightarrow x=2k\ ,\ y=3k\ ,\ z=\frac{k}{3}$

$x^2+y^2+9z^2=56 \Rightarrow$

$4k^2+9k^2+9\cdot\frac{k^2}{9}=56$

$14k^2=56$

$k=2$

$y=3\cdot k=3\cdot 2=6$

Yanıt / Answer D

10. $\frac{x-y}{2}=\frac{-x+z}{-3}=\frac{9}{a} \Rightarrow$

$\frac{x-y-x+z}{2-3}=\frac{9}{a}$

$\frac{z-y}{-1}=3=\frac{9}{a} \Rightarrow a=3$

Yanıt / Answer A

11. $ax=by=cz=32$

$a=\frac{32}{x}\ ,\ b=\frac{32}{y}\ ,\ c=\frac{32}{z}$

$\Rightarrow \frac{1}{a}+\frac{1}{b}+\frac{1}{c}=\frac{1}{\frac{32}{x}}+\frac{1}{\frac{32}{y}}+\frac{1}{\frac{32}{z}}$

$=\frac{x+y+z}{32}$

$=\frac{8}{32}=\frac{1}{4}$

Yanıt / Answer B

12. $\frac{x}{y}=\frac{y}{z+3}=\frac{z}{x+1}=\frac{1}{2}$

$\frac{x+y+z}{x+y+z+4}=\frac{1}{2} \Rightarrow 2(x+y+z)=(x+y+z)+4$

$x+y+z=4$

Yanıt / Answer C

13. $x=\frac{y}{2}=\frac{z}{3}=k$

$\Rightarrow x=k\ ,\ y=2k\ ,\ z=3k$

$x\cdot y+y\cdot z+z\cdot x=22 \Rightarrow$

$k\cdot 2k+2k\cdot 3k+3k\cdot k=22$

$11k^2=22 \Rightarrow k^2=2$

$\Rightarrow y\cdot z=2k\cdot 3k=6\cdot k^2=6\cdot 2=12$

Yanıt / Answer C

14. $\frac{x}{3}=\frac{y}{5}=\frac{z}{7}=k \Rightarrow x=3k\ ,\ y=5k\ ,\ z=7k$

$2x+3y=42$

$2\cdot(3k)+3\cdot 5k=42$

$21k=42$

$k=2$

$\Rightarrow z=7\cdot k=7\cdot 2=14$

Yanıt / Answer D

15. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=\frac{1}{3}$

$\frac{3a}{3b}=\frac{-c}{-d}=\frac{e}{f}=\frac{1}{3}$

$\frac{3a-c+e}{3b-d+f}=\frac{1}{3}$

$\frac{3a+3}{18}=\frac{1}{3} \Rightarrow \begin{cases} 3a+3=6 \\ a=1 \end{cases}$

Yanıt / Answer A

16. $\frac{2a-3c+5e}{2b+5f-3d}=\frac{1}{5}$

$-\frac{8}{35-3d}=\frac{1}{5}$

$35-3d=-40$

$75=3d$

$25=d$

Yanıt / Answer E

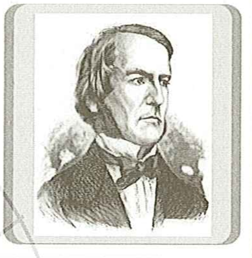
ÜNİTE 3

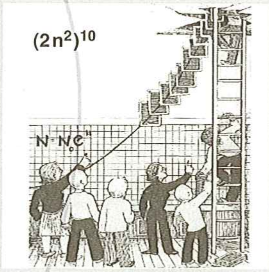
UNIT

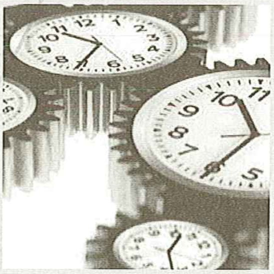
Boole, George [1815 – 1864]

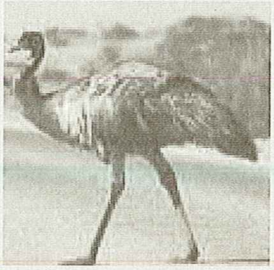
İngiliz matematikçi, matematiksel mantığın babalarından birisi olarak tanınır. İlk büyük çalışması, 1854'de yayımlanan "Düşünme kurallarının incelenmesi (Investigation of the Laws of Thought) " dir. Boolean cebirleri olarak bilinen sembolik çıkarım türünü geliştirmiştir. Onun De Morgan ve diğerleri ile olan çalışması, modern cebirin gelişmesini sağlamıştır.

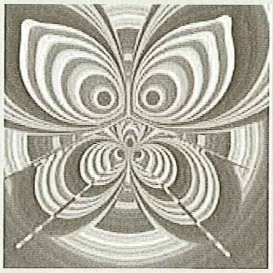
British mathematician who was one of the founding fathers of mathematical logic. His major work, published in 1854, is his Investigation of the Laws of Thought. The kind of Symbolic argument that he developed led to the study of so-called Boolean algebras, which are of current significance in computing and algebra. His work, together with that of De Morgan and others, helped to pave the way for the development of modern formal algebra.





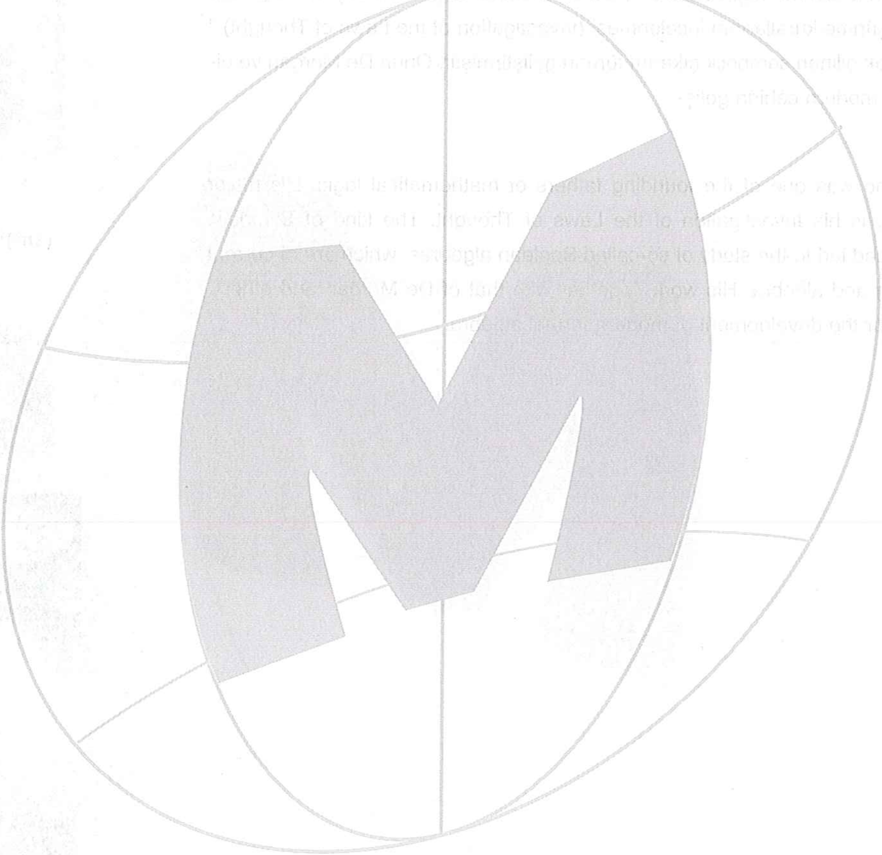






✓ **ÜSLÜ SAYILAR** .... **87 – 106**
✓ **KÖKLÜ SAYILAR** .... **107 – 126**

✓ EXPONENTIALS .... 87 – 106
✓ RADICALS .... 107 – 126



ÜSLÜ SAYILAR
EXPONENTIALS

BÖLÜM
CHAPTER
1

Üslü Sayılar / Exponentials

Test 1

1. $\dfrac{(-2^{-4})^{-3}\cdot(-4^{-2})^{-4}}{(-8)^{-1}\cdot(16^{-4})^{-1}}=?$

A) 2^{15} B) 2^{12} C) 2^{9} D) -2^{9} E) -2^{15}

2. $\dfrac{x^{6}\cdot(-x)^{-2}\cdot(-x)^{3}}{(-x)^{5}\cdot(-x^{6})\cdot x^{-4}}=?$

A) $-x^3$ B) $-x^2$ C) $-x$ D) -1 E) x

3. $\left[2-\left(\dfrac{1}{3}\right)^{-2}\right]^{-1}=?$

A) $-\dfrac{1}{11}$ B) $-\dfrac{1}{7}$ C) -7 D) $\dfrac{1}{11}$ E) $\dfrac{1}{7}$

4. $2^{x}=A \quad \Rightarrow \quad \dfrac{4^{x+1}-2^{4}}{2^{x+1}+2^{2}}=?$

A) $4A+2$ B) $2A+4$ C) $2A-4$

D) $4A-2$ E) $2A$

5. $(x^{m-n}-x^{m+n}):x^{m-n}=?$

A) $x^{2m}+1$ B) $x^{-2m}+1$ C) $x^{2n}-1$

D) $x^{-2n}+1$ E) $1-x^{2n}$

6. $\dfrac{3^{x}+3^{x}+3^{x}+3^{x}}{6^{x}+6^{x}}=\dfrac{1}{32} \quad \Rightarrow \quad x=?$

A) 2 B) 3 C) 4 D) 5 E) 6

7. $9^{x+1}+3^{2x+1}-9^{x-1}=107 \quad \Rightarrow \quad x=?$

A) $\dfrac{1}{4}$ B) $\dfrac{1}{2}$ C) 1 D) -1 E) $-\dfrac{1}{2}$

8. $\dfrac{7^{7}+7^{8}+7^{9}}{7^{7}}=?$

A) 57 B) 55 C) 53 D) 51 E) 49

9. $x^x = 4^{12}$

$x^{2a-5} = 8 \Rightarrow$ **a = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

10. $2^{x+y} = 10^x \Rightarrow \mathbf{2^{\frac{y}{x}} = ?}$

A) 2 B) 3 C) 4 D) 5 E) 6

11. $4^{-1} \cdot 10^{-3x} = 0,00000025 \Rightarrow$ **x = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

12. $\left.\begin{matrix} 2^x = a \\ 3^x = b \end{matrix}\right\} \Rightarrow \mathbf{12^x = ?}$

A) a^2b B) ab^2 C) ab

D) a^3b E) a^2b^2

13. $\left(\frac{2}{3}\right)^{2x+3} < \left(\frac{3}{2}\right)^{x-15}$

$x \in Z \Rightarrow$ **min(x) = ?**

A) 6 B) 5 C) 4 D) 3 E) 2

14. $5 \cdot 2^{x+1} + 13 \cdot 2^x - 2^{x+4} = 56 \Rightarrow$ **x = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

15. $\frac{3^x + 5^x + 7^x}{9^x + 15^x + 21^x} = (27)^{-1} \Rightarrow$ **x = ?**

A) –3 B) –2 C) –1 D) 2 E) 3

16. $x = 3 + 2^{a-1}$, $y = 5 - 2^{a+1} \Rightarrow \mathbf{\frac{x}{y} = ?}$

A) $\frac{y-7}{4y}$ B) $\frac{17+y}{4y}$ C) $\frac{17-y}{4y}$

D) $\frac{y+7}{4y}$ E) $\frac{1}{4} - \frac{7}{y}$

[İSTANBUL ÜNV. YÖS 2013]

Yanıtlar / Answers

1. A	4. C	7. C	10. D	13. B	16. C
2. D	5. E	8. A	11. B	14. C	
3. B	6. E	9. C	12. A	15. E	

1.

$$\frac{(-2^{-4})^{-3}\cdot(-4^{-2})^{-4}}{(-8)^{-1}\cdot(16^{-4})^{-1}}=\frac{(-2^{-4})^{-3}\cdot(2^{16})}{(-2^{-3})\cdot(2^{16})}$$

$$=\frac{2^{12}}{2^{-3}}$$

$$=2^{12-(-3)}=2^{15}$$

Yanıt / Answer A

2.

$$\frac{x^{6}\cdot(-x)^{-2}\cdot(-x)^{3}}{(-x)^{5}\cdot(-x^{6})\cdot x^{-4}}=\frac{-x^{6-2+3}}{x^{5+6-4}}=-\frac{x^{7}}{x^{7}}=-1$$

Yanıt / Answer D

3.

$$\left[2-\left(\frac{1}{3}\right)^{-2}\right]^{-1}=\left[2-(3)^{2}\right]^{-1}$$

$$=[2-9]^{-1}=(-7)^{-1}=-\frac{1}{7}$$

Yanıt / Answer B

4.

$$\frac{4^{x+1}-2^{4}}{2^{x+1}+2^{2}}=\frac{(2^{x+1})^{2}-(2^{2})^{2}}{2^{x+1}+2^{2}}$$

$$=\frac{(2^{x+1}+2^{2})\cdot(2^{x+1}-2^{2})}{(2^{x+1}+2^{2})}$$

$$=2^{x+1}-4$$

$$=2\cdot2^{x}-4$$

$$=2A-4$$

Yanıt / Answer C

5.

$$(x^{m-n}-x^{m+n}):x^{m-n}=\left(\frac{x^{m}}{x^{n}}-x^{m}\cdot x^{n}\right):\frac{x^{m}}{x^{n}}$$

$$=\frac{x^{m}-x^{m}\cdot x^{2n}}{x^{n}}\cdot\frac{x^{n}}{x^{m}}$$

$$=\frac{x^{m}(1-x^{2n})}{x^{n}}\cdot\frac{x^{n}}{x^{m}}$$

$$=1-x^{2n}$$

Yanıt / Answer E

6.

$$\frac{3^{x}+3^{x}+3^{x}+3^{x}}{6^{x}+6^{x}}=\frac{1}{32}$$

$$\frac{3^{x}\cdot4}{3^{x}\cdot2^{x}\cdot2}=\frac{1}{32}$$

$$\frac{2}{2^{x}}=\frac{1}{32}$$

$$2^{x}=64\Rightarrow x=6$$

Yanıt / Answer E

7.

$$9^{x+1}+3^{2x+1}-9^{x-1}=107$$

$$9^{x}\cdot9+3^{2x}\cdot3-9^{x}\cdot\frac{1}{9}=107$$

$$9^{x}(9+3-\frac{1}{9})=107$$

$$\frac{9^{x}}{9}\cdot107=107$$

$$9^{x-1}=1$$

$$x-1=0\Rightarrow x=1$$

Yanıt / Answer C

8.

$$\frac{7^{7}+7^{8}+7^{9}}{7^{7}}=\frac{7^{7}+7\cdot7^{7}+7^{2}\cdot7^{7}}{7^{7}}$$

$$=\frac{7^{7}(1+7+7^{2})}{7^{7}}$$

$$=1+7+49=57$$

Yanıt / Answer A

9. $x^x = 4^{12} = (2^3)^8 = 8^8 \Rightarrow x = 8$

$8^{2a-5} = 8 \Rightarrow 2a - 5 = 1$

$2a = 6$

$a = 3$

Yanıt / Answer C

10. $2^{x+y} = 10^x$

$2^x \cdot 2^y = 2^x \cdot 5^x \Rightarrow 2^y = 5^x$

$2^{\frac{y}{x}} = (2^y)^{\frac{1}{x}} = (5^x)^{\frac{1}{x}} = 5$

Yanıt / Answer D

11. $4^{-1} \cdot 10^{-3x} = 0{,}00000025$

$\frac{1}{4} \cdot 10^{-3x} = 25 \cdot 10^{-8}$

$0{,}25 \cdot 10^{-3x} = 25 \cdot 10^{-8}$

$25 \cdot 10^{-3x-2} = 25 \cdot 10^{-8}$

$-3x - 2 = -8$

$-3x = -6$

$x = 2$

Yanıt / Answer B

12. $\left.\begin{aligned} 2^x &= a \\ 3^x &= b \end{aligned}\right\} \Rightarrow 12^x = 4^x \cdot 3^x$

$= (2^x)^2 \cdot 3^x$

$= a^2 \cdot b$

Yanıt / Answer A

13. $\left(\frac{2}{3}\right)^{2x+3} < \left(\frac{3}{2}\right)^{x-15}$

$\left(\frac{3}{2}\right)^{-2x-3} < \left(\frac{3}{2}\right)^{x-15}$

$-2x - 3 < x - 15$

$-3 + 15 < x + 2x$

$12 < 3x$

$4 < x$

$\Rightarrow \min(x) = 5$

Yanıt / Answer B

14. $5 \cdot 2^{x+1} + 13 \cdot 2^x - 2^{x+4} = 56$

$2^x(10 + 13 - 16) = 56$

$2^x \cdot 7 = 56 \Rightarrow 2^x = 8$

$x = 3$

Yanıt / Answer C

15. $\frac{3^x + 5^x + 7^x}{9^x + 15^x + 21^x} = (27)^{-1}$

$\frac{3^x + 5^x + 7^x}{3^x \cdot 3^x + 3^x \cdot 5^x + 3^x \cdot 7^x} = (3^3)^{-1}$

$\frac{3^x + 5^x + 7^x}{3^x(3^x + 5^x + 7^x)} = \frac{1}{3^3}$

$\frac{1}{3^x} = \frac{1}{3^3} \Rightarrow x = 3$

Yanıt / Answer E

16. $x = 3 + 2^{a-1}$ | $y = 5 - 2^{a+1}$

$x - 3 = 2^a \cdot \frac{1}{2}$ | $2^{a+1} = 5 - y$

$2x - 6 = 2^a$ | $2^a = \frac{5-y}{2}$

$2x - 6 = \frac{5-y}{2}$

$4x - 12 = 5 - y$

$4x + y = 17$

$x = \frac{17-y}{4} \Rightarrow \frac{x}{y} = \frac{\frac{17-y}{4}}{y} = \frac{17-y}{4y}$

Yanıt / Answer C

1. $\dfrac{(-2)^{16} \cdot (-2)^{20} \cdot (-2^{10})}{(-4^{8}) \cdot (-4)^{8} \cdot (-4)^{5}} = ?$

A) –16 B) –8 C) –4 D) 8 E) 16

2. $0,0000000048 \cdot 10^{x} = 4,8 \Rightarrow$ **x = ?**

A) –10 B) –9 C) 1 D) 9 E) 10

3. $(0,0081)^{-\frac{1}{4}} = x \Rightarrow x = ?$

A) $\dfrac{3}{10}$ B) $\dfrac{1}{2}$ C) 1 D) 2 E) $\dfrac{10}{3}$

4. $A = 2^{2x+1}$

$B = 3^{2x+1}$

$A \cdot B = 36 \Rightarrow$ **x = ?**

A) $-\dfrac{1}{2}$ B) $\dfrac{1}{2}$ C) 1 D) 2 E) 3

5. $\dfrac{\left(-\frac{1}{2}\right)^{3} \cdot \left(-2^{6}\right)}{(-2^{3})(-2)^{-2}} = ?$

A) – 4 B) $-\dfrac{1}{2}$ C) $-\dfrac{1}{4}$ D) $\dfrac{1}{2}$ E) $\dfrac{1}{4}$

6. $6 \cdot 3^{2x-1} + 2 \cdot 3^{2x+1} = 24 \Rightarrow$ **x = ?**

A) $\dfrac{1}{2}$ B) $\dfrac{1}{4}$ C) 1 D) 2 E) 3

7. $(2x + 1)^{4} = (0,0016)^{-2} \Rightarrow$ **x = ?** $(x \in R^{+})$

A) 6 B) $\dfrac{25}{3}$ C) 12 D) $\dfrac{27}{2}$ E) 14

8. $6^{x+1} = 3^{x-3} \Rightarrow$ **2^{x} = ?**

A) 162 B) 132 C) 64 D) $\dfrac{1}{32}$ E) $\dfrac{1}{162}$

9. $\left\{\left[(x)^{-1}\right]^{-2}\right\}^{-1} : \left\{\left[(-x)^{-1}\right]^{-1}\right\}^{-2} = ?$

A) -1 B) x^{-1} C) x D) 1 E) 2

10. $\left.\begin{array}{l} 2^x = 27 \\ 2^y = 3 \end{array}\right\} \Rightarrow \dfrac{x+y}{y} = ?$

A) $\frac{1}{3}$ B) $\frac{3}{4}$ C) 3 D) 4 E) 6

11. $(0,064)^{\frac{2}{3}} + \left(\dfrac{125}{64}\right)^{-\frac{2}{3}} = ?$

A) 0,01 B) 0,04 C) 0,16 D) 0,8 E) 0,4

12. $(x+2)^{x^2-x-6} = 1 \Rightarrow \sum x = ?$

A) -3 B) -2 C) -1 D) 2 E) 3

13. $\dfrac{(0,3)^9}{(0,09)^4} = A \Rightarrow A = ?$

A) $\frac{3}{10}$ B) $\frac{1}{5}$ C) $\frac{1}{10}$ D) 3 E) 10

14. $A = \left(\dfrac{3}{5}\right)^x \Rightarrow (0,6)^{3x-1} = ?$

A) A^3 B) $5A^3$ C) $3A^3$ D) $\frac{5}{3}A^3$ E) $\frac{3}{5}A^3$

15. $\dfrac{x^{17} + x^{15} + x^{13}}{x^{16} + x^{14} + x^{12}} = A \Rightarrow A = ?$

A) $-x$ B) x C) x^{-1} D) -1 E) 1

16. $\dfrac{10^x + 10^{x+1}}{5^x + 5^x + 5^x + 5^x} = 44 \Rightarrow x = ?$

A) 6 B) 5 C) 4 D) 3 E) 2

[KTÜ. YÖS 2013]

Yanıtlar / Answers

1. A	4. B	7. C	10. D	13. A	16. C
2. D	5. A	8. E	11. D	14. D	
3. E	6. A	9. D	12. C	15. B	

1. $$\frac{(-2)^{16}\cdot(-2)^{20}\cdot(-2^{10})}{(-4^{8})\cdot(-4)^{8}\cdot(-4)^{5}}=\frac{2^{16}\cdot 2^{20}\cdot(-2^{10})}{(-2^{16})\cdot 2^{16}\cdot(-2)^{10}}$$

$$=\frac{-2^{46}}{2^{42}}=-16$$

Yanıt / Answer A

2. $0{,}0000000048\cdot 10^{x}=4{,}8$

$4{,}8\cdot 10^{-9}\cdot 10^{x}=4{,}8$

$4{,}8\cdot 10^{x-9}=4{,}8 \Rightarrow x-9=0$

$x=9$

Yanıt / Answer D

3. $(0{,}0081)^{-\frac{1}{4}}=x \Rightarrow \left(81\cdot 10^{-4}\right)^{-\frac{1}{4}}=\frac{1}{3}\cdot 10=\frac{10}{3}$

Yanıt / Answer E

4. $$\left.\begin{array}{l} A=2^{2x+1} \\ B=3^{2x+1} \end{array}\right\rangle \Rightarrow A\cdot B=6^{2x+1}=36=6^{2}$$

$2x+1=2$

$x=\frac{1}{2}$

Yanıt / Answer B

5. $$\frac{\left(-\frac{1}{2}\right)^{3}\cdot\left(-2^{6}\right)}{(-2^{3})(-2)^{-2}}=\frac{(-2^{-3})\cdot(-2^{6})}{(-2^{3})\cdot(2)^{-2}}$$

$$=\frac{2^{3}}{-2}=-2^{2}=-4$$

Yanıt / Answer A

6. $6\cdot 3^{2x-1}+2\cdot 3^{2x+1}=24$

$6\cdot 3^{2x}\cdot\frac{1}{3}+2\cdot 3^{2x}\cdot 3=24$

$3^{2x}(2+6)=24$

$3^{2x}=3$

$2x=1$

$x=\frac{1}{2}$

Yanıt / Answer A

7. $(2x+1)^{4}=(0{,}0016)^{-2}$

$(2x+1)^{4}=(0{,}04)^{-4}$

$(2x+1)^{4}=\left(\frac{100}{4}\right)^{4}=25^{4}$

$2x+1=25 \quad , \quad 2x+1=-25$

$2x=24 \qquad 2x=-26$

$x=12 \qquad x=-13$

$x\in R^{+} \Rightarrow x=12$

Yanıt / Answer C

8. $6^{x+1}=3^{x-3}$

$6^{x}\cdot 6=3^{x}\cdot\frac{1}{27}$

$3^{x}\cdot 2^{x}\cdot 6=3^{x}\cdot\frac{1}{27}$

$2^{x}=\frac{1}{27}\cdot\frac{1}{6}$

$2^{x}=\frac{1}{162}$

Yanıt / Answer E

9. $\left\{\left[(x)^{-1}\right]^{-2}\right\}^{-1} : \left\{\left[(-x)^{-1}\right]^{-1}\right\}^{-2} = x^{(-1)\cdot(-2)\cdot(-1)} : x^{(-1)\cdot(-1)\cdot(-2)}$

$= x^{-2} : x^{-2} = 1$

Yanıt / Answer D

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10. $\left.\begin{matrix} 2^{x} = 3^{3} \\ 2^{y} = 3 \end{matrix}\right\} \Rightarrow \dfrac{x}{y} = \dfrac{3}{1} \Rightarrow x = 3y$

$\dfrac{x+y}{y} = \dfrac{3y+y}{y} = \dfrac{4y}{y} = 4$

Yanıt / Answer D

---

11. $(0{,}064)^{\frac{2}{3}} + \left(\dfrac{125}{64}\right)^{-\frac{2}{3}} = \left((0{,}4)^{3}\right)^{\frac{2}{3}} + \left(\left(\dfrac{5}{4}\right)^{3}\right)^{-\frac{2}{3}}$

$= (0{,}4)^{2} + \left(\dfrac{5}{4}\right)^{-2}$

$= \dfrac{16}{100} + \dfrac{16}{25} = \dfrac{80}{100} = 0{,}8$

Yanıt / Answer D

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12. **i.** $x^2 - x - 6 = 0$

$(x - 3)\cdot(x + 2) = 0$

$x = 3 \;,\; x = -2$

$x = -2 \Rightarrow x - 2 = -2 + 2 = 0 \Rightarrow x \neq -2$

ii. $x + 2 = 1 \Rightarrow x = -1$

iii. $x + 2 = -1 \Rightarrow x = -3$

$\Rightarrow (-3)^2 - (-3) - 6 = 6$ (çift / even)

$\sum x = (3) + (-1) + (-3) = -1$

Yanıt / Answer C

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13. $\dfrac{(0{,}3)^{9}}{(0{,}09)^{4}} = \dfrac{(3\cdot 10^{-1})^{9}}{(9\cdot 10^{-2})^{4}}$

$= \dfrac{3^{9}\cdot 10^{-9}}{9^{4}\cdot 10^{-8}}$

$= \dfrac{3^{9}\cdot 10^{-9}}{3^{8}\cdot 10^{-8}} = 3\cdot 10^{-1} = \dfrac{3}{10}$

Yanıt / Answer A

---

14. $A = \left(\dfrac{3}{5}\right)^{x} = (0{,}6)^{x}$

$(0{,}6)^{3x-1} = \dfrac{(0{,}6)^{3x}}{0{,}6} = \dfrac{\left((0{,}6)^{x}\right)^{3}}{0{,}6}$

$= \dfrac{A^{3}}{0{,}6} = \dfrac{5A^{3}}{3}$

Yanıt / Answer D

---

15. $\dfrac{x^{17} + x^{15} + x^{13}}{x^{16} + x^{14} + x^{12}} = \dfrac{x^{13}\cdot x^{4} + x^{13}\cdot x^{2} + x^{13}}{x^{12}\cdot x^{4} + x^{12}\cdot x^{2} + x^{12}}$

$\dfrac{x^{13}(x^{4} + x^{2} + 1)}{x^{12}(x^{4} + x^{2} + 1)} = x^{13-12} = x$

Yanıt / Answer B

---

16. $\dfrac{10^{x} + 10^{x+1}}{5^{x} + 5^{x} + 5^{x} + 5^{x}} = \dfrac{10^{x}\cdot 11}{5^{x}\cdot 4} = \dfrac{2^{x}\cdot 11}{4} = 44$

$2^{x} = 16$

$x = 4$

Yanıt / Answer C

1. $\dfrac{3^x+3^x+3^x+3^x}{(0,5)^x+(0.5)^x}=\dfrac{81}{32^{3-x}} \Rightarrow$ **x = ?**

A) –2 B) –3 C) –1 D) 2 E) 4

2. $5^x = 2,\ 5^y = 6,\ (0,2)^{x-2y+1} = A \Rightarrow$ **A = ?**

A) 3,6 B) 1,2 C) 12 D) 24 E) 36

3. $\dfrac{2^{x+1}-2^x+3\cdot 2^{x-1}}{2^{1-x}+2^{-x}-2^{-1-x}}=64 \Rightarrow$ **x = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

4. $(x-2)^{x^2-4}=1,\ x\in Z \Rightarrow$ **$\sum x$ = ?**

A) –2 B) –1 C) 0 D) 1 E) 2

5. $36^{x+1} = 4^{x-1}\cdot 9^{x+1}\cdot A \Rightarrow$ **A = ?**

A) 9 B) 12 C) 16 D) 18 E) 20

6. $A = 2^x + 2^{-x}$

$B = 4^x + 4^{-x} \Rightarrow$ **B = ?**

A) $A^2 - 2$ B) $A^2 - 1$ C) $A^2 + 1$ D) $A^2 + 4$ E) A^2

7. $7^{2x+y-1} = 5^{x-y-8} \Rightarrow$ **x – 2y = ?**

A) 7 B) 9 C) 10 D) 11 E) 13

8. $19 = 9^{2x}$

$9^{x^2+y^2} = 19^y \Rightarrow$ **x = ?**

A) 1 B) $\dfrac{y}{2}$ C) y D) 2y E) 3y

9. $36+3^{x+1}\cdot 6^{x}=\frac{54}{18^{1-x}}+6^{x} \Rightarrow$ **$x=?$**

A) 0 B) 1 C) 2 D) 3 E) 4

10. $\frac{16^{x}-1}{(2^{x}+1)(2^{2x}+1)}=63 \Rightarrow$ **$x=?$**

A) 3 B) 4 C) 5 D) 6 E) 7

11. $n \in \mathbb{N}$,

$5^{1}\cdot 5^{2}\cdot 5^{3}\ldots 5^{2n-1}=(0,0016)^{-9}$

$\Rightarrow$ **$n=?$**

A) 3 B) $\frac{7}{2}$ C) 4 D) $\frac{9}{2}$ E) 6

12. $A=76\cdot 10^{-2}+9\cdot 10^{-3}$

$B=2\cdot 10^{-1}+31\cdot 10^{-3}$

$\Rightarrow$ **$A+B=?$**

A) 0,9 B) 0,93 C) 1 D) 1,2 E) 1,9

13. $0,25\cdot 10^{2x-3}=(0,4)^{-1}\cdot 10^{3x-8}$

$\Rightarrow$ **$x=?$**

A) 3 B) 4 C) 5 D) 6 E) 8

14. $\frac{3}{4x^{a-b}-3}+\frac{4}{3x^{b-a}-4}=?$

A) −2 B) −1 C) 0 D) 1 E) 2

15. $(0,25)^{2x-3}\cdot 8^{3x-4}=1 \Rightarrow$ **$x=?$**

A) $\frac{3}{5}$ B) $\frac{4}{5}$ C) 1 D) $\frac{6}{5}$ E) $\frac{7}{5}$

Yanıtlar / Answers				
1. E	4. D	7. E	10. D	13. B
2. A	5. C	8. C	11. E	14. B
3. C	6. A	9. C	12. C	15. D

1.

$$\frac{3^x+3^x+3^x+3^x}{(0{,}5)^x+(0.5)^x}=\frac{81}{32^{3-x}}$$

$$\frac{3^x+3^x+3^x+3^x}{(\frac{1}{2})^x+(\frac{1}{2})^x}=\frac{3^4}{(2^5)^{3-x}}$$

$$\frac{3^x(4)}{(\frac{1}{2})^x(2)}=\frac{3^4}{2^{15-5x}}$$

$$3^x\cdot 2\cdot 2^x=3^4\cdot 2^{-15+5x}$$

$$3^x\cdot 2^{x+1}=3^4\cdot 2^{-15+5x}$$

$$3^x=3^4 \;\Rightarrow\; x=4$$

Yanıt / Answer E

2.

$$(0{,}2)^{x-2y+1}=\left(\frac{1}{5}\right)^{x-2y+1}$$

$$=5^{-x}\cdot 5^{2y}\cdot 5^{-1}$$

$$=(5^x)^{-1}\cdot(5^y)^2\cdot\frac{1}{5}$$

$$=2^{-1}\cdot 6^2\cdot\frac{1}{5}$$

$$=\frac{36}{10}=3{,}6$$

Yanıt / Answer A

3.

$$\frac{2^{x+1}-2^x+3\cdot 2^{x-1}}{2^{1-x}+2^{-x}-2^{-1-x}}=64$$

$$\frac{2^x\cdot 2-2^x+3\cdot 2^x\cdot\frac{1}{2}}{2\cdot 2^{-x}+2^{-x}-\frac{1}{2}\cdot 2^{-x}}=64$$

$$\frac{2^x\cdot\left(2-1+\frac{3}{2}\right)}{2^{-x}\cdot\left(2+1-\frac{1}{2}\right)}=64$$

$$\frac{2^x\cdot\frac{5}{2}}{2^{-x}\cdot\frac{5}{2}}=64$$

$$2^{2x}=64$$

$$2x=6$$

$$x=3$$

Yanıt / Answer C

4. **i.** $x^2-4=0 \Rightarrow x=2\;,\;x=-2$

$x=2 \Rightarrow (2-2)^{2^2-4}=0^0 \Rightarrow x\neq 2$

ii. $x-2=1 \Rightarrow x=3$

iii. $x-2=-1$

$x=1 \;\Rightarrow x^2-4=-3$ (tek / odd)

$\Rightarrow \sum x=(-2)+3=1$

Yanıt / Answer D

5.

$$36^{x+1}=4^{x-1}\cdot 9^{x+1}\cdot A$$

$$36^x\cdot 36=4^x\cdot\frac{1}{4}\cdot 9^x\cdot 9\cdot A$$

$$36^x\cdot 36=36^x\cdot\frac{9}{4}\cdot A$$

$$\frac{9}{4}\cdot A=36$$

$$A=36\cdot\frac{4}{9}$$

$$=16$$

Yanıt / Answer C

6.

$$B=(2^x)^2+(2^{-x})^2$$

$$=(2^x+2^{-x})^2-2\cdot 2^x\cdot 2^{-x}$$

$$=(2^x+2^{-x})^2-2$$

$$=A^2-2$$

Yanıt / Answer A

7. $7^{2x+y-1}=5^{x-y-8}$

$\Rightarrow\; 2x+y-1=0\;,\;x-y-8=0$

$$\begin{array}{rl} & 2x+y=1 \\ + & x-y=8 \\ \hline & 3x=9 \end{array}$$

$x=3 \Rightarrow y=-5$

$x-2y=3-2\cdot(-5)=13$

Yanıt / Answer E

8. $19 = 9^{2x}$

$$9^{x^2+y^2} = 19^y$$

$$\frac{1}{y} = \frac{2x}{x^2+y^2}$$

$$x^2 + y^2 = 2xy$$

$$x^2 - 2xy + y^2 = 0$$

$$(x-y)^2 = 0$$

$$x = y$$

Yanıt / Answer C

9. $36+3^{x+1}\cdot 6^x = \dfrac{54}{18^{1-x}} + 6^x$

$$36+3^x\cdot 3\cdot 6^x = \frac{54}{\frac{18}{18^x}} + 6^x$$

$$36+3\cdot 18^x = 3\cdot 18^x + 6^x$$

$$6^x = 36$$

$$x = 2$$

Yanıt / Answer C

10. $\dfrac{16^x-1}{(2^x+1)\cdot(2^{2x}+1)} = 63$

$$\frac{(4^x-1)\cdot(4^x+1)}{(2^x+1)\cdot(4^x+1)} = 63$$

$$\frac{(2^x-1)\cdot(2^x+1)}{(2^x+1)} = 63 \Rightarrow \quad 2^x-1 = 63$$

$$2^x = 64$$

$$x = 6$$

Yanıt / Answer D

11. $5^1\cdot 5^2\cdot 5^3\ldots\cdot 5^{2n-1} = (16\cdot 10^{-4})^{-9}$

$$5^{1+2+3+\ldots+2n-1} = \frac{10^{36}}{2^{36}}$$

$$5^{n^2} = 5^{36}$$

$$n^2 = 36 \Rightarrow n = 6$$

Yanıt / Answer E

12. $A = 76\cdot 10^{-2} + 9\cdot 10^{-3}$

$$B = 2\cdot 10^{-1} + 31\cdot 10^{-3}$$

$$A + B = (76 + 20)\cdot 10^{-2} + (9 + 31)\cdot 10^{-3}$$

$$= 96\cdot 10^{-2} + 40\cdot 10^{-3}$$

$$= 96\cdot 10^{-2} + 4\cdot 10^{-2}$$

$$= 100\cdot 10^{-2} = 1$$

Yanıt / Answer C

13. $0{,}25\cdot 10^{2x-3} = (0{,}4)^{-1}\cdot 10^{3x-8}$

$$25\cdot 10^{2x-5} = \left(\frac{2}{5}\right)^{-1}\cdot 10^{3x-8}$$

$$25\cdot 10^{2x-5} = 2{,}5\cdot 10^{3x-8}$$

$$25\cdot 10^{2x-5} = 25\cdot 10^{3x-9}$$

$$2x-5 = 3x-9$$

$$4 = x$$

Yanıt / Answer B

14. $\dfrac{3}{4x^{a-b}-3} + \dfrac{4}{3x^{b-a}-4} = \dfrac{3}{\dfrac{4\cdot x^a}{x^b}-3} + \dfrac{4}{\dfrac{3x^b}{x^a}-4}$

$$= \frac{3x^b}{4x^a-3x^b} + \frac{4x^a}{3x^b-4x^a}$$

$$= \frac{3x^b-4x^a}{4x^a-3x^b} = -1$$

Yanıt / Answer B

15. $(0{,}25)^{2x-3}\cdot 8^{3x-4} = 1$

$$\left(\frac{1}{4}\right)^{2x-3}\cdot(2^3)^{3x-4} = 1$$

$$2^{-4x+6}\cdot 2^{9x-12} = 1$$

$$2^{5x-6} = 1 \Rightarrow 5x-6 = 0 \Rightarrow x = \frac{6}{5}$$

Yanıt / Answer D

1. $\frac{9^x-36^x}{3^x+6^x}+6^x=A,\quad x=4 \Rightarrow \mathbf{A=?}$

A) –81 B) –9 C) 9 D) 27 E) 81

2. $3^x-3^{x-1}=2$

$2^{y-2}+2^{xy}=10 \Rightarrow \mathbf{y=?}$

A) 1 B) 2 C) 3 D) 4 E) 5

3. $\frac{7^{x+1}+3\cdot7^x}{2\cdot7^{x+1}-8\cdot7^{x-1}}=?$

A) $\frac{7}{10}$ B) $\frac{7}{9}$ C) $\frac{7}{8}$ D) 1 E) $\frac{7}{6}$

4. $8^{x+y} : 2^{y-2x}=16^{-1}$

$3^{2x+1}\cdot27^{x+y}=81 \Rightarrow \mathbf{y=?}$

A) 2 B) 3 C) 5 D) 7 E) 9

5. $\frac{(0,02)^4\cdot(0,3)^3}{54\cdot10^{-10}}=?$

A) $\frac{3}{5}$ B) $\frac{4}{5}$ C) 1 D) $\frac{6}{5}$ E) $\frac{7}{5}$

6. $\frac{\left(-\frac{1}{2}\right)^3\cdot\left(\frac{2}{3}\right)^3\cdot(-2)^2}{(-2^2)(-\frac{1}{3})^2}=?$

A) $\frac{1}{3}$ B) $\frac{1}{2}$ C) 1 D) $-\frac{1}{2}$ E) $-\frac{1}{3}$

7. $\frac{3^x+3^x+3^x+3^x}{6^x+6^x+6^x+6^x}=128 \Rightarrow \mathbf{x=?}$

A) –7 B) –6 C) –5 D) 5 E) 6

8. $\left.\begin{array}{l}\frac{x}{y}=2\\ \left(\frac{y}{x}\right)^{\frac{1}{a}}=32\end{array}\right\} \Rightarrow \mathbf{5^{5a}=?}$

A) $\frac{1}{25}$ B) $\frac{1}{5}$ C) 1 D) $-\frac{1}{5}$ E) $-\frac{1}{25}$

9. $2^{x+1} = 6^{x+1} \Rightarrow (27)^{x+1} = ?$

A) 0 B) 1 C) 27 D) 81 E) 729

10. $\left.\begin{array}{l} 5^{x} = 2 \\ 3^{y} = \dfrac{2}{5} \end{array}\right\} \Rightarrow 5^{x+1} \cdot 3^{y+1} = ?$

A) 4 B) 6 C) 8 D) 10 E) 12

11. $0 < a < 1, \quad x \in Z,$

$a^{5x+1} > a^{4x-7} \Rightarrow \max(x) = ?$

A) –5 B) –6 C) –7 D) –8 E) –9

12. $y \in Z,$

$(0,5)^{4x+8} < 16^{y-x} \Rightarrow \min(y) = ?$

A) –3 B) –2 C) –1 D) 1 E) 2

13. $3^{x-y} = \left(\dfrac{1}{27}\right)^{6-y}$

$5^{3x-2y} = 5 \cdot 25^{5} \Rightarrow x = ?$

A) 6 B) 7 C) 8 D) 9 E) 10

14. $\left.\begin{array}{l} 2^{x} \cdot 3^{y} = 18 \\ 2^{y} \cdot 3^{x} = 12 \end{array}\right\} \Rightarrow x + y = ?$

A) 5 B) 4 C) 3 D) 2 E) 1

15. $\left.\begin{array}{l} 5^{x} = 27 \\ 81 = 25^{y} \end{array}\right\} \Rightarrow \dfrac{3x+y}{x-2y} = ?$

A) –13 B) –11 C) –10 D) –7 E) 5

16. $\left(\dfrac{1}{27}\right)^{x} = 3^{x} + 3^{x} + 3^{x} \Rightarrow x^{-2} = ?$

A) –16 B) –8 C) –4 D) 8 E) 16

Yanıtlar / Answers

1. E	4. D	7. A	10. E	13. C	16. E
2. C	5. B	8. B	11. E	14. C	
3. B	6. A	9. B	12. C	15. B	

1.

$$A=\frac{9^x-36^x}{3^x+6^x}+6^x=\frac{(3^x)^2-(6^x)^2}{3^x+6^x}+6^x$$

$$=\frac{(3^x-6^x)(3^x+6^x)}{3^x+6^x}+6^x$$

$$=3^x-6^x+6^x$$

$$=3^x$$

$$x=4 \Rightarrow A=3^4=81$$

Yanıt / Answer E

2.

$$3^x-3^{x-1}=3^x-3^x\cdot 3^{-1}=2 \Rightarrow 3^x\cdot(1-\frac{1}{3})=2$$

$$3^x=3$$

$$x=1$$

$$2^{y-2}+2^{xy}=2^y\cdot 2^{-2}+2^{1y}=10$$

$$2^y\cdot(\frac{1}{4}+1)=10 \Rightarrow 2^y\cdot\frac{5}{4}=10$$

$$2^y=8$$

$$y=3$$

Yanıt / Answer C

3.

$$\frac{7^{x+1}+3\cdot 7^x}{2\cdot 7^{x+1}-8\cdot 7^{x-1}}=\frac{7^x\cdot 7^1+3\cdot 7^x}{2\cdot 7^x\cdot 7^1-8\cdot 7^x\cdot 7^{-1}}$$

$$=\frac{7^x\cdot(7+3)}{7^x\cdot(2\cdot 7-8\cdot\frac{1}{7})}$$

$$=\frac{7^x\cdot 10}{7^x\cdot(14-\frac{8}{7})}$$

$$=\frac{10}{\frac{90}{7}}=\frac{7}{9}$$

Yanıt / Answer B

4.

$$\frac{2^{3x+3y}}{2^{y-2x}}=2^{-4} \Rightarrow 2^{5x+2y}=2^{-4}$$

$$\Rightarrow 5x+2y=-4$$

$$3^{2x+1}\cdot 3^{3x+3y}=3^4 \Rightarrow 3^{5x+3y+1}=3^4$$

$$5x+3y+1=4$$

$$5x+3y=3$$

$$\left.\begin{aligned}-/\,5x+2y&=-4\\ 5x+3y&=3\end{aligned}\right\} \Rightarrow y=7$$

Yanıt / Answer D

5.

$$\frac{(0{,}02)^4\cdot(0{,}3)^3}{54\cdot 10^{-10}}=\frac{(2\cdot 10^{-2})^4\cdot(3\cdot 10^{-1})^3}{54\cdot 10^{-10}}$$

$$=\frac{2^4\cdot 10^{-8}\cdot 3^3\cdot 10^{-3}}{54\cdot 10^{-10}}$$

$$=\frac{16\cdot 27\cdot 10^{-11}}{54\cdot 10^{-10}}$$

$$=8\cdot 10^{-11+10}$$

$$=8\cdot 10^{-1}=\frac{8}{10}=\frac{4}{5}$$

Yanıt / Answer B

6.

$$\frac{\left(-\frac{1}{2}\right)^3\cdot\left(\frac{2}{3}\right)^3\cdot(-2)^2}{(-2^2)(-\frac{1}{3})^2}=\frac{\left(-\frac{1}{8}\right)\left(\frac{8}{27}\right)\cdot 4}{(-4)\cdot\frac{1}{9}}$$

$$=\frac{-\frac{4}{27}}{-\frac{4}{9}}=\frac{9}{27}=\frac{1}{3}$$

Yanıt / Answer A

7.

$$\frac{3^x+3^x+3^x+3^x}{6^x+6^x+6^x+6^x}=128$$

$$\frac{4\cdot 3^x}{4\cdot 6^x}=128 \Rightarrow 2^{-x}=128$$

$$2^{-x}=2^7$$

$$x=-7$$

Yanıt / Answer A

8.

$$\frac{x}{y}=2 \Rightarrow x=2y$$

$$\left(\frac{y}{x}\right)^{\frac{1}{a}}=32 \Rightarrow 2^{-\frac{1}{a}}=2^5$$

$$-\frac{1}{a}=5$$

$$a=-\frac{1}{5}$$

$$5^{5a}=5^{5\cdot(-\frac{1}{5})}=5^{-1}=\frac{1}{5}$$

Yanıt / Answer B

L

9. $2^{x+1}=6^{x+1}$

$2^{x}\cdot 2=6^{x}\cdot 6 \Rightarrow \dfrac{2}{6}=3^{x}$

$3^{-1}=3^{x}$

$x=-1$

$(27)^{x+1}=(27)^{-1+1}=1$

Yanıt / Answer B

10. $5^{x+1}\cdot 3^{y+1}=5^{x}\cdot 5\cdot 3^{y}\cdot 3$

$=5^{x}\cdot 3^{y}\cdot 15$

$=2\cdot\dfrac{2}{5}\cdot 15=12$

Yanıt / Answer E

11. $a^{5x+1}>a^{4x-7}$

$0<a<1 \Rightarrow 5x+1<4x-7$

$5x-4x<-7-1$

$x<-8$

$\Rightarrow \max(x)=-9$

Yanıt / Answer E

12. $\left(\dfrac{1}{2}\right)^{4x+8}<(2^{4})^{y-x}$

$2^{-4x-8}<2^{4y-4x}$

$-4x-8<4y-4x$

$-8<4y$

$-2<y$

$\Rightarrow \min(y)=-1$

Yanıt / Answer C

13. $3^{x-y}=(3^{-3})^{6-y} \Rightarrow 3^{x-y}=3^{-18+3y}$

$x-y=-18+3y$

$x-4y=-18$ .... **(1)**

$5^{3x-2y}=5\cdot(5^{2})^{5}$

$5^{3x-2y}=5^{11} \Rightarrow 3x-2y=11$........... **(2)**

$$\left.\begin{array}{l} x-4y=-18 \\ 3x-2y=11 \end{array}\right\} \Rightarrow x=8$$

Yanıt / Answer C

14.

$$\begin{array}{rl} & 2^{x}\cdot 3^{y}=18 \\ \times & 2^{y}\cdot 3^{x}=12 \\ \hline \end{array}$$

$2^{x}\cdot 2^{y}\cdot 3^{x}\cdot 3^{y}=216$

$2^{x+y}\cdot 3^{x+y}=216$

$6^{x+y}=6^{3} \Rightarrow x+y=3$

Yanıt / Answer C

15.

$$\left.\begin{array}{l} 5^{x}=3^{3} \\ 5^{2y}=3^{4} \end{array}\right\} \Rightarrow \dfrac{x}{2y}=\dfrac{3}{4}$$

$4x=6y$

$2x=3y$

$\Rightarrow x=3k\ ,\ y=2k$

$\dfrac{3x+y}{x-2y}=\dfrac{3\cdot 3k+2k}{3k-4k}=\dfrac{11k}{-k}=-11$

Yanıt / Answer B

16. $\left(\dfrac{1}{27}\right)^{x}=3^{x}+3^{x}+3^{x}$

$3^{-3x}=3\cdot 3^{x} \Rightarrow -3x=x+1$

$x=-\dfrac{1}{4}$

$x^{-2}=\left(-\dfrac{1}{4}\right)^{-2}=16$

Yanıt / Answer E

By yos lovers
L

1. $7^a + 7^a + 7^a + 7^a + 7^a = 45 \Rightarrow (7^{-1})^{2a} = ?$

A) $\frac{1}{81}$ B) $\frac{1}{9}$ C) 9 D) 81 E) 243

2. $\left(\frac{0{,}018}{0{,}006}\right)^{2a-1} = 9^{1-a} \Rightarrow a = ?$

A) $\frac{3}{4}$ B) $\frac{1}{4}$ C) $\frac{1}{3}$ D) 3 E) 4

3. $a, b \in Z^+$,

$3^{a^2-b^2} = 243$,

$\Rightarrow a \cdot b = ?$

A) 8 B) 7 C) 6 D) 5 E) 4

4. $x \in R^+$,

$x^{a-b} = 5 \Rightarrow \frac{x^a + x^b}{x^a - x^b} = ?$

A) $-\frac{1}{2}$ B) $\frac{1}{2}$ C) $\frac{3}{4}$ D) $\frac{3}{2}$ E) 1

5. $2^{x-1} + \frac{2}{2^{1-x}} = 192 \Rightarrow x = ?$

A) 0 B) 1 C) 2 D) 5 E) 7

6. $\left.\begin{array}{l} 5^a - 9^b = 544 \\ 5^{\frac{a}{2}} - 3^b = 16 \end{array}\right\} \Rightarrow a \cdot b = ?$

A) 2 B) 4 C) 6 D) 8 E) 9

7. $\left(\frac{3}{5}\right)^n = x$,

$\frac{3^{n+2} + 2 \cdot 3^n}{5^{n+2} - 3 \cdot 5^n} = ?$

A) $\frac{x}{2}$ B) x C) $\frac{3x}{2}$ D) 2x E) $\frac{5x}{2}$

8. $\frac{1}{(0{,}\overline{4})^x} = \frac{12^{2x+1}}{4^x + 4^x + 4^x} \Rightarrow x = ?$

A) $-\frac{1}{2}$ B) 0 C) $\frac{1}{2}$ D) 1 E) 2

9. $\left.\begin{matrix} 2^{2x}=5 \\ 5^{y}=64 \end{matrix}\right\}, \; x^{2}+y^{2}=21 \Rightarrow \mathbf{(x-y)^{2}=?}$

A) 15　B) 12　C) 10　D) 8　E) 2

10. $a \in \mathbb{R}$,

$x = 4 - 3 \cdot 2^{2a-1}$

$y = 3 + 5 \cdot 4^{-a+2}$

$\Rightarrow \mathbf{(x-4)\cdot(y-3)=?}$

A) -2^{a}　B) 2^{a+3}　C) -120

D) -144　E) 128

11. $\left.\begin{matrix} x=2^{-3} \\ y=(-2)^{-2} \\ z=-3^{-2} \end{matrix}\right\} \Rightarrow \mathbf{?>?>?}$

A) $z>x>y$　B) $y>z>x$　C) $z>y>x$

D) $x>y>z$　E) $y>x>z$

12. $m<0<n$,

$(6m-7)^{8}=(3n+7)^{8} \Rightarrow \dfrac{\mathbf{4m+3n}}{\mathbf{2m-n}}=\mathbf{?}$

A) $-\dfrac{1}{4}$　B) $-\dfrac{1}{2}$　C) $\dfrac{1}{4}$　D) $\dfrac{1}{2}$　E) 2

13. $\left.\begin{matrix} x=n+5^{a} \\ y=2+n\cdot5^{-a} \end{matrix}\right\} \Rightarrow \mathbf{y=?}$

A) $\dfrac{2x-n}{x-n}$　B) $\dfrac{2}{x-n}$　C) $\dfrac{2x}{x-n}$

D) $\dfrac{2}{x+n}$　E) $\dfrac{2x+n}{x-n}$

14. $\dfrac{5}{3^{2n-1}}+4\cdot3^{1-2n}=81 \Rightarrow \mathbf{n=?}$

A) -1　B) $-\dfrac{1}{2}$　C) $-\dfrac{1}{3}$　D) $-\dfrac{1}{4}$　E) $-\dfrac{1}{6}$

15. $\left(-\dfrac{1}{2}\right)^{1-2n}(-2)^{2n+1}\left(\dfrac{1}{8}\right)^{-n}=128 \Rightarrow \mathbf{n=?}$

A) -2　B) -1　C) 0

D) 1　E) 2

[AKDENİZ ÜNV. YÖS 2013]

Yanıtlar / Answers

1. A	4. D	7. A	10. C	13. A
2. A	5. E	8. A	11. E	14. B
3. C	6. D	9. A	12. B	15. D

1. $7^a+7^a+7^a+7^a+7^a=45$

$7^a\cdot5=45 \Rightarrow 7^a=9$

$(7^{-1})^{2a}=(7^a)^{-2}=(9)^{-2}=\frac{1}{81}$

Yanıt / Answer A

2. $\left(\frac{0,018}{0,006}\right)^{2a-1}=\left(\frac{18}{6}\right)^{2a-1}=9^{1-a}$

$3^{2a-1}=3^{2-2a}$

$2a-1=2-2a$

$4a=3$

$a=\frac{3}{4}$

Yanıt / Answer A

3. $3^{a^2-b^2}=3^5$

$a^2-b^2=5$

$\underbrace{(a-b)}_{1}\cdot\underbrace{(a+b)}_{5}=5$

$a-b=1$

$+\quad a+b=5$

$$\left.\begin{array}{l}2a=6 \Rightarrow a=3\\ a=3 \Rightarrow b=2\end{array}\right\rangle \Rightarrow a\cdot b=3\cdot2=6$$

Yanıt / Answer C

4. $x^{a-b}=5 \Rightarrow \frac{x^a}{x^b}=5$

$x^a=5\cdot x^b$

$\frac{x^a+x^b}{x^a-x^b}=\frac{5x^b+x^b}{5x^b-x^b}=\frac{6x^b}{4x^b}=\frac{3}{2}$

Yanıt / Answer D

5. $2^{x-1}+\frac{2}{2^{1-x}}=192$

$\frac{2^x}{2}+\frac{2}{\frac{2}{2^x}}=192$

$\frac{2^x}{2}+2^x=192$

$\frac{3}{2}\cdot2^x=192 \Rightarrow 2^x=128$

$x=7$

Yanıt / Answer E

6. $5^a-9^b=544$

$(5^{\frac{a}{2}})^2-(3^b)^2=544$

$\underbrace{(5^{\frac{a}{2}}-3^b)}_{16}\cdot(5^{\frac{a}{2}}+3^b)=544$

$\Rightarrow \quad 5^{\frac{a}{2}}+3^b=34$

$5^{\frac{a}{2}}-3^b=16$

$2\cdot5^{\frac{a}{2}}=50$

$5^{\frac{a}{2}}=25 \Rightarrow \frac{a}{2}=2 \Rightarrow a=4$

$$\left.\begin{array}{l}a=4 \Rightarrow 5^{\frac{4}{2}}+3^b=34\\ 25+3^b=34\\ 3^b=9\\ b=2\end{array}\right\} \Rightarrow a\cdot b=4\cdot2=8$$

Yanıt / Answer D

7. $\left(\frac{3}{5}\right)^n=x \Rightarrow$

$\frac{3^{n+2}+2\cdot3^n}{5^{n+2}-3\cdot5^n}=\frac{3^2\cdot3^n+2\cdot3^n}{25\cdot5^n-3\cdot5^n}$

$=\frac{3^n\cdot(3^2+2)}{5^n\cdot(25-3)}$

$=\left(\frac{3}{5}\right)^n\cdot\left(\frac{11}{22}\right)=\frac{x}{2}$

Yanıt / Answer A

8. $$\frac{1}{(0,\overline{4})^x}=\frac{12^{2x+1}}{4^x+4^x+4^x}$$

$$\frac{1}{\left(\frac{4}{9}\right)^x}=\frac{12^{2x}\cdot 12}{4^x\cdot 3}$$

$$\frac{9^x}{4^x}=\frac{12^{2x}\cdot 12}{4^x\cdot 3}$$

$$9^x=4\cdot 12^{2x}$$

$$3^{2x}=4\cdot 12^{2x}$$

$$1=4\cdot 4^{2x}\ \Rightarrow\ 2x+1=0$$

$$x=-\frac{1}{2}$$

Yanıt / Answer A

9. $$\left.\begin{array}{l}2^{2x}=5\\ 2^6=5^y\end{array}\right\}\Rightarrow \frac{2x}{6}=\frac{1}{y}\Rightarrow 2xy=6$$

$$\Rightarrow (x-y)^2=x^2+y^2-2xy=\ 21-6=15$$

Yanıt / Answer A

10. $$(x-4)\cdot(y-3)=(4-3\cdot 2^{2a-1}-4)\cdot(3+5\cdot 4^{-a+2}-3)$$

$$=(-3\cdot 2^{2a-1})\cdot(5\cdot 4^{-a+2})$$

$$=-15\cdot 2^{2a-1}\cdot 2^{-2a+4}$$

$$=-15\cdot 2^3$$

$$=-15\cdot 8=-120$$

Yanıt / Answer C

11. $$\left.\begin{array}{l}x=(2^3)^{-1}\\ y=(2^2)^{-1}\\ z=-(3^2)^{-1}\end{array}\right\}\Rightarrow\ y>x>z$$

Yanıt / Answer E

12. $m<0<n\ \Rightarrow\ 6m-7=-3n-7$

$$6m=-3n$$

$$2m=-n$$

$$\frac{4m+3n}{2m-n}=\frac{4m+3\cdot(-2m)}{2m-(-2m)}=-\frac{2m}{4m}=-\frac{1}{2}$$

Yanıt / Answer B

13. $x=n+5^a\ \Rightarrow\ 5^a=x-n$

$$y=2+n\cdot 5^{-a}\ \Rightarrow\ y=2+n\cdot\frac{1}{5^a}$$

$$=2+\frac{n}{x-n}$$

$$=\frac{2x-2n+n}{x-n}$$

$$=\frac{2x-n}{x-n}$$

Yanıt / Answer A

14. $$\frac{5}{3^{2n-1}}+4\cdot 3^{1-2n}=81$$

$$\frac{5}{\frac{3^{2n}}{3}}+4\cdot\frac{3}{3^{2n}}=3^4$$

$$\frac{15}{3^{2n}}+\frac{12}{3^{2n}}=3^4$$

$$27=3^4\cdot 3^{2n}\Rightarrow 2n+4=3$$

$$n=-\frac{1}{2}$$

Yanıt / Answer B

15. $$\left(-\frac{1}{2}\right)^{1-2n}(-2)^{2n+1}\left(\frac{1}{8}\right)^{-n}=128\ \Rightarrow$$

$$(-2)^{2n-1}\cdot(-2)^{2n+1}\cdot 2^{3n}=128$$

$$2^{7n}=2^7$$

$$n=1$$

Yanıt / Answer D

KÖKLÜ SAYILAR
RADICALS

BÖLÜM
CHAPTER
2

Köklü Sayılar / Radicals

Test 1

1. $\sqrt{162}-\sqrt{72}+\sqrt{\frac{2}{25}}-\sqrt{\frac{8}{9}}=?$

A) $\frac{47\sqrt{2}}{15}$ B) $\frac{43\sqrt{2}}{15}$ C) $\frac{41\sqrt{2}}{15}$

D) $\frac{38\sqrt{2}}{15}$ E) $\frac{34\sqrt{2}}{15}$

2. $(\sqrt{0{,}04}+\sqrt{0{,}09})\cdot x=50 \Rightarrow \sqrt{x}=?$

A) 10 B) 8 C) 5 D) 4 E) 2

3. $\sqrt{1{,}44}+\sqrt{0{,}81}-\sqrt{0{,}01}=?$

A) 7 B) 6 C) 5 D) 3 E) 2

4. $A=\sqrt{\frac{9}{25}+\frac{1}{16}-\frac{3}{10}} \Rightarrow A=?$

A) $\frac{3}{20}$ B) $\frac{5}{20}$ C) $\frac{7}{20}$ D) $\frac{9}{20}$ E) $\frac{11}{20}$

5. $\frac{\sqrt{1{,}08}+\sqrt{0{,}48}-\sqrt{0{,}12}}{\sqrt{0{,}75}}=?$

A) $\frac{16}{5}$ B) $\frac{13}{5}$ C) $\frac{12}{5}$ D) $\frac{9}{5}$ E) $\frac{8}{5}$

6. $\sqrt{(-7)^2}+(-3)^2-\sqrt[4]{(-5)^4}+\sqrt[3]{(-3)^3}=?$

A) 1 B) 2 C) 3 D) 4 E) 8

7. $\sqrt{1-\frac{5}{9}}-\sqrt{1+\frac{5}{4}}=?$

A) $-\frac{5}{6}$ B) $-\frac{1}{6}$ C) $-\frac{4}{3}$ D) $\frac{4}{3}$ E) $\frac{5}{6}$

8. $x=\sqrt{5},\ y=4\sqrt{2}$

$x^{20}\cdot y^{6}=A\cdot 10^{n},\quad A,n\in Z^{+}$

$\Rightarrow A+n=?$

A) 32 B) 42 C) 48 D) 52 E) 56

9. $A=\sqrt{7-\sqrt{32+\sqrt{21-\sqrt{25}}}} \Rightarrow A=?$

A) 1 B) 2 C) 3 D) 4 E) 5

10. $\sqrt{5000}\cdot x=A,\ A\in N \Rightarrow \min(x)=?$

A) 1 B) $\sqrt{2}$ C) 3 D) $\sqrt{3}$ E) $\sqrt{5}$

11. $A=\sqrt{x-3}+\sqrt{3-x}+x^2-2x-2$

$A\in R \Rightarrow A=?$

A) 0 B) 1 C) 2 D) 3 E) 4

12. $\sqrt{16x+16}+\sqrt{4x+4}-\sqrt{x+1}=10 \Rightarrow x=?$

A) 1 B) 2 C) 3 D) 4 E) 5

13. $A=\sqrt{108\sqrt{\frac{1}{18}\sqrt{4}}} \Rightarrow A=?$

A) 4 B) 5 C) 6 D) 7 E) 8

14. $\dfrac{\sqrt[4]{0,0144}-\sqrt[4]{0,0004}}{\sqrt[3]{0,001}}=?$

A) $\sqrt{3}-\sqrt{2}$ B) $\sqrt{3}-2\sqrt{2}$

C) $4\sqrt{3}-2\sqrt{2}$ D) $2\sqrt{3}-\sqrt{2}$

E) $4\sqrt{3}-\sqrt{2}$

15. $\sqrt{1-\sqrt{1-\frac{17}{81}}}=?$

A) $\frac{1}{3}$ B) $\frac{1}{2}$ C) 1 D) 2 E) 3

16. $\sqrt[3]{2\sqrt{21-\sqrt{23+\sqrt{4}}}}=?$

A) 6 B) 5 C) 4

D) 3 E) 2

[İSTANBUL ÜNV. YÖS 2013]

Yanıtlar / Answers

1. D	4. C	7. A	10. B	13. C	16. E
2. A	5. E	8. B	11. B	14. D	
3. E	6. E	9. A	12. C	15. A	

1. $\sqrt{162}-\sqrt{72}+\sqrt{\frac{2}{25}}-\sqrt{\frac{8}{9}}$

$=9\sqrt{2}-6\sqrt{2}+\frac{\sqrt{2}}{5}-\frac{2\sqrt{2}}{3}$

$=\sqrt{2}\left(9-6+\frac{1}{5}-\frac{2}{3}\right)=\frac{38\sqrt{2}}{15}$

Yanıt / Answer D

2. $\left(\sqrt{0,04}+\sqrt{0,09}\right)\cdot x=50$

$(0,2+0,3)\cdot x=50$

$x=\frac{50}{0,5}=100$

$\Rightarrow \sqrt{x}=\sqrt{100}=10$

Yanıt / Answer A

3. $\sqrt{1,44}+\sqrt{0,81}-\sqrt{0,01}=1,2+0,9-0,1$

$=2$

Yanıt / Answer E

4. $\sqrt{\left(\frac{3}{5}\right)^2+\left(\frac{1}{4}\right)^2-\frac{3}{10}}=\sqrt{\left(\frac{3}{5}-\frac{1}{4}\right)^2}$

$=\left|\frac{3}{5}-\frac{1}{4}\right|=\frac{7}{20}$

Yanıt / Answer C

5. $\frac{\sqrt{1,08}+\sqrt{0,48}-\sqrt{0,12}}{\sqrt{0,75}}$

$=\frac{\sqrt{\frac{108}{100}}+\sqrt{\frac{48}{100}}-\sqrt{\frac{12}{100}}}{\sqrt{\frac{75}{100}}}$

$=\frac{\frac{6}{10}\sqrt{3}+\frac{4}{10}\sqrt{3}-\frac{2}{10}\sqrt{3}}{\frac{5}{10}\sqrt{3}}=\frac{\frac{8}{10}\sqrt{3}}{\frac{5}{10}\sqrt{3}}=\frac{8}{5}$

Yanıt / Answer E

6. $\sqrt{(-7)^2}+(-3)^2-\sqrt[4]{(-5)^4}+\sqrt[3]{(-3)^3}$

$=|-7|+9-|-5|-3$

$=7+9-5-3=8$

Yanıt / Answer E

7. $\sqrt{1-\frac{5}{9}}-\sqrt{1+\frac{5}{4}}=\sqrt{\frac{4}{9}}-\sqrt{\frac{9}{4}}$

$=\frac{2}{3}-\frac{3}{2}=-\frac{5}{6}$

Yanıt / Answer A

8. $x=\sqrt{5},\ y=4\sqrt{2}$

$x^{20}\cdot y^{6}=A\cdot 10^{n}$

$\Rightarrow (\sqrt{5})^{20}\cdot(4\sqrt{2})^{6}=A\cdot 10^{n}$

$5^{10}\cdot 4^{6}\cdot 2^{3}=A\cdot 10^{n}$

$5^{10}\cdot 2^{15}=10^{10}\cdot 2^{5}=A\cdot 10^{n}$

$\Rightarrow A=2^{5},\ n=10$

$\Rightarrow A+n=2^{5}+10=32+10=42$

Yanıt / Answer B

9. $\sqrt{7-\sqrt{32+\sqrt{21-\sqrt{25}}}}=\sqrt{7-\sqrt{32+\sqrt{21-5}}}$

$=\sqrt{7-\sqrt{32+4}}$

$=\sqrt{7-6}=1$

Yanıt / Answer A

10. $\sqrt{5000}\cdot x=A$

$\sqrt{100\cdot 25\cdot 2}\cdot x=A$

$50\sqrt{2}\cdot x=A$

$A\in N \Rightarrow \min(x)=\sqrt{2}$

$$\begin{array}{r|l} 5000 & 100 \\ 50 & 25 \\ 2 & 2 \\ 1 & \end{array}$$

Yanıt / Answer B

11. $\sqrt{x-3}+\sqrt{3-x}+x^2-2x-2=A$

$x-3\geq 0 \quad , \quad 3-x\geq 0 \quad \Rightarrow \quad x=3$

$\Rightarrow \quad A=\sqrt{3-3}+\sqrt{3-3}+3^2-2\cdot 3-2$

$A=9-6-2=1$

Yanıt / Answer B

12.

$\sqrt{16x+16}+\sqrt{4x+4}-\sqrt{x+1}=10$

$\sqrt{16\cdot(x+1)}+\sqrt{4\cdot(x+1)}-\sqrt{x+1}=10$

$4\sqrt{x+1}+2\sqrt{x+1}-\sqrt{x+1}=10$

$\sqrt{x+1}\cdot(4+2-1)=10$

$\sqrt{x+1}=2$

$x+1=4$

$x=3$

Yanıt / Answer C

13. $\sqrt{108\sqrt{\frac{1}{18}\cdot\sqrt{4}}}=\sqrt{108\sqrt{\frac{1}{18}\cdot 2}}$

$=\sqrt{108\sqrt{\frac{1}{9}}}$

$=\sqrt{\frac{108}{3}}=\sqrt{36}=6$

Yanıt / Answer C

14. $\dfrac{\sqrt[4]{0,0144}-\sqrt[4]{0,0004}}{\sqrt[3]{0,001}}$

$=\dfrac{\frac{\sqrt{12}}{10}-\frac{\sqrt{2}}{10}}{\frac{1}{10}}$

$=\sqrt{12}-\sqrt{2}=2\sqrt{3}-\sqrt{2}$

Yanıt / Answer D

15. $\sqrt{1-\sqrt{1-\frac{17}{81}}}=\sqrt{1-\sqrt{\frac{64}{81}}}$

$=\sqrt{1-\frac{8}{9}}=\sqrt{\frac{1}{9}}=\frac{1}{3}$

Yanıt / Answer A

16. $\sqrt[3]{2\sqrt{21-\sqrt{23+\sqrt{4}}}}=\sqrt[3]{2\sqrt{21-\sqrt{25}}}$

$=\sqrt[3]{2\sqrt{21-5}}$

$=\sqrt[3]{2\cdot 4}$

$=2$

Yanıt / Answer E

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1. $\dfrac{\sqrt[5]{2}\cdot\sqrt[5]{16}}{\sqrt[6]{2}\cdot\sqrt[3]{2}\cdot\sqrt{2}}=?$

2 A) $2\sqrt{2}$ B) $\sqrt{2}$ C) $\dfrac{1}{\sqrt{2}}$ D) 1 E)

2. $A=\sqrt{3}+1,\ B=\sqrt{3}-1 \Rightarrow \dfrac{1}{A^2}+\dfrac{1}{B^2}=?$

A) $2\sqrt{3}$ B) $\sqrt{3}$ C) $\dfrac{1}{\sqrt{3}}$ D) 1 E) 2

3. $\sqrt[3]{a\sqrt{a^2\sqrt[3]{a}}}=x,\ a=3^{\frac{9}{13}} \Rightarrow x=?$

A) $2\sqrt{3}$ B) $\sqrt{3}$ C) 3 D) $\dfrac{1}{3}$ E) $\dfrac{1}{6}$

4. $3\sqrt{12}+2\sqrt{108}-\dfrac{5}{\sqrt{3}}=?$

A) $\dfrac{49\sqrt{3}}{3}$ B) $\dfrac{50\sqrt{3}}{3}$ C) $\dfrac{52\sqrt{3}}{3}$ D) $\dfrac{53\sqrt{3}}{3}$ E) $\dfrac{59\sqrt{3}}{3}$

5. $A=\sqrt[3]{\dfrac{1}{16}\cdot\sqrt[5]{(-16)\cdot\sqrt[3]{(-8)}}} \Rightarrow A=?$

A) $-\dfrac{1}{2}$ B) -1 C) $\dfrac{1}{2}$ D) 1 E) $\dfrac{1}{4}$

6. $\sqrt[6]{32\sqrt[6]{32\sqrt[6]{32\ldots}}}+\sqrt{5-\sqrt{13+\sqrt{9}}}=?$

A) 7 B) 6 C) 5 D) 4 E) 3

7. $\dfrac{\sqrt[4]{27\cdot\sqrt[4]{27\cdot\sqrt[4]{27\ldots}}}}{\sqrt[3]{9:\sqrt[3]{9:\sqrt[3]{9\ldots}}}}=?$

A) $3\sqrt{3}$ B) $2\sqrt{3}$ C) $\sqrt{3}$ D) 1 E) 3

8. $\sqrt{5}+\dfrac{6}{\sqrt{5}-1}-\dfrac{10}{\sqrt{5}+1}=?$

A) 1 B) 2 C) $\sqrt{5}$ D) 3 E) 4

9. $\left.\begin{array}{l} A = 2\sqrt{3} - 2 \\ B = 2\sqrt{3} + 2 \end{array}\right\} \Rightarrow \dfrac{\mathbf{A \cdot B}}{\mathbf{B - 2}} = ?$

A) $\dfrac{4\sqrt{3}}{3}$ B) $\sqrt{3}$ C) $\dfrac{2\sqrt{3}}{3}$ D) $\dfrac{\sqrt{3}}{3}$ E) $\dfrac{\sqrt{6}}{6}$

10. $(\sqrt{7} - \sqrt{3})(\sqrt{10 + 2\sqrt{21}}) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

11. $(3 + \sqrt{2})(\sqrt{11 - 6\sqrt{2}}) = ?$

A) 3 B) 4 C) 5 D) 6 E) 7

12. $\sqrt{3\sqrt[3]{3\sqrt{3}}} = \sqrt[6]{3^{x+1}} \Rightarrow x = ?$

A) $\dfrac{9}{2}$ B) $\dfrac{7}{2}$ C) $\dfrac{5}{2}$ D) $\dfrac{3}{2}$ E) $\dfrac{1}{2}$

13. $\dfrac{1}{\sqrt{4 - \sqrt{12}}} + \dfrac{1}{\sqrt{4 + 2\sqrt{3}}} - \sqrt{3} = ?$

A) 0 B) 1 C) 2 D) $\sqrt{3}$ E) $2\sqrt{3}$

14. $\sqrt[3]{x \cdot \sqrt[3]{x \cdot \sqrt[3]{x \ldots}}} = \sqrt{56 - \sqrt{56 - \sqrt{56}}} \ldots \Rightarrow x = ?$

A) $\sqrt{17}$ B) $\sqrt{7}$ C) 7 D) 14 E) 49

15. $\sqrt{x + \sqrt{x + \sqrt{x + \ldots}}} = 4 \Rightarrow x = ?$

A) 2 B) 4 C) 8 D) 12 E) 16

16. $(\sqrt{2} - \sqrt{5})^3 = ?$

A) $5\sqrt{2} + 10\sqrt{5}$ B) $17\sqrt{2} - 11\sqrt{5}$

C) $7\sqrt{2} - 3\sqrt{5}$ D) $12\sqrt{2} + 7\sqrt{5}$

E) $7\sqrt{2} - 11\sqrt{5}$

[YILDIZ TEKNİK ÜNV. YÖS 2013]

Yanıtlar / Answers

1. D	4. A	7. C	10. D	13. A	16. B
2. E	5. C	8. E	11. E	14. E	
3. B	6. E	9. A	12. B	15. D	

1.
$$\frac{\sqrt[5]{2}\cdot\sqrt[5]{16}}{\sqrt[6]{2}\cdot\sqrt[3]{2}\cdot\sqrt{2}}=\frac{2^{\frac{1}{5}}\cdot 2^{\frac{4}{5}}}{2^{\frac{1}{6}}\cdot 2^{\frac{1}{3}}\cdot 2^{\frac{1}{2}}}$$
$$=\frac{2^{\frac{1}{5}+\frac{4}{5}}}{2^{\frac{1}{6}+\frac{1}{3}+\frac{1}{2}}}$$
$$=\frac{2}{2}=1$$

Yanıt / Answer D

2.
$$\frac{1}{A^2}+\frac{1}{B^2}=\frac{1}{\left(\sqrt{3}+1\right)^2}+\frac{1}{\left(\sqrt{3}-1\right)^2}$$
$$=\frac{1}{4+2\sqrt{3}}+\frac{1}{4-2\sqrt{3}}$$
$$=\frac{4-2\sqrt{3}+4+2\sqrt{3}}{\left(4+2\sqrt{3}\right)\cdot\left(4-2\sqrt{3}\right)}$$
$$=\frac{8}{16-12}=\frac{8}{4}=2$$

Yanıt / Answer E

3.
$$\sqrt[3]{a\cdot\sqrt{a^2\sqrt[3]{a}}}=\sqrt[3\cdot 2\cdot 3]{a^{3\cdot 2}\cdot a^{2\cdot 3}\cdot a}$$
$$=\sqrt[18]{a^6\cdot a^6\cdot a}$$
$$=\sqrt[18]{a^{13}}$$
$$a=3^{\frac{9}{13}}\Rightarrow\sqrt[18]{\left(3^{\frac{9}{13}}\right)^{13}}=\sqrt[18]{3^9}=\sqrt{3}$$

Yanıt / Answer B

4.
$$3\sqrt{12}+2\sqrt{108}-\frac{5}{\sqrt{3}}$$
$$=3\cdot 2\sqrt{3}+2\cdot 6\sqrt{3}-\frac{5\sqrt{3}}{\sqrt{3}\cdot\sqrt{3}}$$
$$=6\sqrt{3}+12\sqrt{3}-\frac{5\sqrt{3}}{3}=\frac{49\sqrt{3}}{3}$$

Yanıt / Answer A

5.
$$\sqrt[3]{\frac{1}{16}\cdot\sqrt[5]{(-16)\cdot\sqrt[3]{(-8)}}}=A$$
$$\sqrt[3]{\frac{1}{16}\cdot\sqrt[5]{(-16)\cdot(-2)}}=\sqrt[3]{\frac{1}{16}\cdot\sqrt[5]{32}}$$
$$=\sqrt[3]{\frac{1}{16}\cdot 2}=\sqrt[3]{\frac{1}{8}}=\frac{1}{2}$$

Yanıt / Answer C

6.
$$\sqrt[6]{32\sqrt[6]{32\sqrt[6]{32\ldots}}}=\sqrt[6-1]{32}=\sqrt[5]{2^5}=2$$
$$\sqrt{5-\sqrt{13+\sqrt{9}}}=\sqrt{5-\sqrt{16}}=\sqrt{5-4}=1$$
$$\Rightarrow\sqrt[6]{32\sqrt[6]{32\sqrt[6]{32\ldots}}}+\sqrt{5-\sqrt{13+\sqrt{9}}}=2+1=3$$

Yanıt / Answer E

7.
$$\frac{\sqrt[4]{27\cdot\sqrt[4]{27\cdot\sqrt[4]{27\ldots}}}}{\sqrt[3]{9:\sqrt[3]{9:\sqrt[3]{9\ldots}}}}=\frac{\sqrt[3]{27}}{\sqrt[4]{9}}$$
$$=\frac{3}{\sqrt{3}}=\sqrt{3}$$

Yanıt / Answer C

8.
$$\sqrt{5}+\underset{(\sqrt{5}+1)}{\frac{6}{\sqrt{5}-1}}-\underset{(\sqrt{5}-1)}{\frac{10}{\sqrt{5}+1}}$$
$$=\sqrt{5}+\frac{6\cdot(\sqrt{5}+1)}{5-1}-\frac{10\cdot(\sqrt{5}-1)}{5-1}$$
$$=\sqrt{5}+\frac{6\sqrt{5}+6}{4}-\frac{10\sqrt{5}-10}{4}$$
$$=\frac{4\sqrt{5}+6\sqrt{5}+6-10\sqrt{5}+10}{4}=4$$

Yanıt / Answer E

9. $\dfrac{A.B}{B-2}=\dfrac{\left(2\sqrt{3}-2\right)\cdot\left(2\sqrt{3}+2\right)}{2\sqrt{3}+2-2}$

$=\dfrac{12-4}{2\sqrt{3}}=\dfrac{4}{\sqrt{3}}=\dfrac{4\sqrt{3}}{3}$

Yanıt / Answer A

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10. $\left(\sqrt{7}-\sqrt{3}\right)\cdot\left(\sqrt{10+2\sqrt{21}}\right)$

$\swarrow\ \searrow$

$7\quad 3$

$=\left(\sqrt{7}-\sqrt{3}\right)\cdot\left(\sqrt{7}+\sqrt{3}\right)$

$=7-3=4$

Yanıt / Answer D

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11. $\sqrt{11-6\sqrt{2}}=\sqrt{11-2\sqrt{18}}$

$\swarrow\ \searrow$

$9\quad 2$

$=\sqrt{9}-\sqrt{2}=3-\sqrt{2}$

$\Rightarrow\left(3+\sqrt{2}\right)\cdot\sqrt{11-6\sqrt{2}}=\left(3+\sqrt{2}\right)\cdot\left(3-\sqrt{2}\right)$

$=9-2=7$

Yanıt / Answer E

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12. $\sqrt{3\cdot\sqrt[3]{3\sqrt{3}}}=\sqrt[12]{3^6\cdot 3^2\cdot 3}=\sqrt[6]{3^{x+1}}$

$=3^{\frac{9}{12}}=3^{\frac{x+1}{6}}$

$\Rightarrow\dfrac{3}{4}=\dfrac{x+1}{6}\Rightarrow 4x+4=18$

$4x=14\Rightarrow x=\dfrac{7}{2}$

Yanıt / Answer B

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13. $\dfrac{1}{\sqrt{4-2\sqrt{3}}}+\dfrac{1}{\sqrt{4+2\sqrt{3}}}-\sqrt{3}$

$\swarrow\ \searrow$

$3\quad 1$

$=\dfrac{1}{\sqrt{3}-1}+\dfrac{1}{\sqrt{3}+1}-\sqrt{3}$

$=\dfrac{\sqrt{3}+1+\sqrt{3}-1}{3-1}-\sqrt{3}$

$=\dfrac{2\sqrt{3}}{2}-\sqrt{3}$

$=\sqrt{3}-\sqrt{3}=0$

Yanıt / Answer A

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14. $\sqrt[3]{x\sqrt[3]{\sqrt[3]{\sqrt{x\ldots}}}}=\sqrt{56-\sqrt{56-\sqrt{56\ldots}}}$

$\swarrow\ \searrow$

$8\quad 7$

$\Rightarrow\sqrt{x}=7\Rightarrow x=49$

Yanıt / Answer E

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15. $\sqrt{x+\sqrt{x+\sqrt{x\ldots}}}=4$

$\swarrow\ \searrow$

$4\quad (4-1)$

$\Rightarrow x=4\cdot 3=12$

Yanıt / Answer D

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16. $(\sqrt{2}-\sqrt{5})^3=(\sqrt{2})^3-3(\sqrt{2})^2\sqrt{5}+3\sqrt{2}(\sqrt{5})^2-(\sqrt{5})^3$

$=2\sqrt{2}-6\sqrt{5}+15\sqrt{2}-5\sqrt{5}$

$=17\sqrt{2}-11\sqrt{5}$

Yanıt / Answer B

1. $A \in R,\ x \in Z$

$A = \sqrt{2x-16} - \sqrt{20-2x}$

$\Rightarrow \sum x = ?$

A) 17 B) 19 C) 23 D) 27 E) 29

2. $\sqrt[4]{(-9)^2} + \sqrt[3]{(-8^2)} - \sqrt[4]{(-2)^4} = ?$

A) –5 B) –3 C) 0 D) 3 E) 5

3. $\dfrac{\sqrt{130}\cdot\sqrt{180}}{\sqrt{520}} = ?$

A) $3\sqrt{5}$ B) $2\sqrt{5}$ C) $\sqrt{5}$ D) $2\sqrt{3}$ E) $\sqrt{3}$

4. $\dfrac{\sqrt{27}+\sqrt{27}+\sqrt{27}}{\sqrt{27}\cdot\sqrt{27}\cdot\sqrt{27}} = ?$

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{1}{6}$ D) $\frac{1}{9}$ E) $\frac{1}{27}$

5. $\dfrac{\sqrt[4]{0,0016}\cdot\sqrt[5]{0,00001}}{\sqrt[3]{0,027}} = ?$

A) $\frac{1}{3}$ B) $\frac{2}{3}$ C) 1 D) $\frac{4}{3}$ E) $\frac{1}{15}$

6. $\dfrac{\sqrt{2}-\dfrac{3}{\sqrt{2}}}{\sqrt{2}+\dfrac{3}{\sqrt{2}}} = ?$

A) $-\frac{1}{5}$ B) $-\frac{2}{5}$ C) $-\frac{1}{2}$ D) $\frac{1}{2}$ E) $\frac{1}{5}$

7. $\sqrt{\dfrac{36}{25}+\dfrac{49}{16}-\dfrac{21}{5}} = ?$

A) $\frac{7}{20}$ B) $\frac{9}{20}$ C) $\frac{11}{20}$ D) $\frac{13}{20}$ E) $\frac{17}{20}$

8. $\dfrac{\sqrt{3}\cdot\sqrt[3]{3}\cdot\sqrt[4]{3}}{\sqrt[6]{243}} = ?$

A) $4\sqrt{3}$ B) $\sqrt{3}$ C) 3 D) $\sqrt{3}$ E) $\sqrt[4]{3}$

9. $\sqrt{x-\sqrt{x-\sqrt{x-\dots}}} = 9 \Rightarrow x = ?$

A) 81 B) 90 C) 99 D) 100 E) 110

10. $\sqrt[3]{5\sqrt[4]{x}} = \sqrt[3]{25}\cdot\sqrt[4]{5} \Rightarrow x = ?$

A) 5^4 B) 5^5 C) 5^6 D) 5^7 E) 5^8

11. $x > 0$

$\sqrt{x+3} - \sqrt{x+1} = 4$

$\Rightarrow \sqrt{x+3} + \sqrt{x+1} = A = ?$

A) $\frac{3}{4}$ B) $\frac{1}{2}$ C) $\frac{1}{4}$ D) $\frac{3}{2}$ E) $\frac{5}{2}$

12. $\dfrac{\sqrt{3}-1}{\sqrt{6}+\sqrt{3}-\sqrt{2}-1} = ?$

A) $\sqrt{2}-1$ B) $\sqrt{2}$ C) $\sqrt{2}+1$

D) $\sqrt{3}-1$ E) $\sqrt{3}+1$

13. $A = \sqrt{3}+2,\ B = \sqrt{3}-2 \Rightarrow \dfrac{A}{B} + \dfrac{B}{A} = ?$

A) –14 B) –10 C) –7 D) 7 E) 14

14. $\sqrt{3-\sqrt{5}} - \sqrt{3+\sqrt{5}} = ?$

A) $-\sqrt{5}$ B) $-\sqrt{3}$ C) $-\sqrt{2}$ D) $\sqrt{2}$ E) $\sqrt{3}$

15. $A = \sqrt{42+\sqrt{42+\sqrt{42}}}\ \dots$

$B = \sqrt[4]{8\sqrt[4]{8\sqrt[4]{8}}}\ \dots \Rightarrow A\cdot B = ?$

A) 9 B) 12 C) 13 D) 14 E) 18

16. $\sqrt{(\sqrt{5}-2)^2} - \sqrt{(1-\sqrt{5})^2} = ?$

A) –1 B) 0 C) $2\sqrt{5}$

D) 3 E) $-1+2\sqrt{5}$

[KTÜ. YÖS 2013]

Yanıtlar / Answers

1. D	4. D	7. C	10. D	13. A	16. A
2. B	5. E	8. E	11. B	14. C	
3. A	6. A	9. B	12. A	15. D	

1. $\sqrt{2x-16} \Rightarrow 2x-16\geq 0 \Rightarrow x\geq 8$

$\sqrt{20-2x} \Rightarrow 20-2x\geq 0 \Rightarrow x\leq 10$

$\Rightarrow 10\geq x\geq 8 \Rightarrow \sum x=8+9+10=27$

Yanıt / Answer D

2. $\sqrt[4]{(-9)^2}+\sqrt[3]{(-8^2)}-\sqrt[4]{(-2)^4}$

$=|-3|+(-4)-|-2|$

$=3-4-2=-3$

Yanıt / Answer B

3. $\frac{\sqrt{130}\cdot\sqrt{180}}{\sqrt{520}}=\sqrt{\frac{130\cdot 180}{520}}$

$=\sqrt{45}=3\sqrt{5}$

Yanıt / Answer A

4. $\frac{\sqrt{27}+\sqrt{27}+\sqrt{27}}{\sqrt{27}\cdot\sqrt{27}\cdot\sqrt{27}}=\frac{3\sqrt{27}}{27\sqrt{27}}=\frac{1}{9}$

Yanıt / Answer D

5. $\frac{\sqrt[4]{0,0016}\cdot\sqrt[5]{0,00001}}{\sqrt[3]{0,027}}=\frac{\sqrt[4]{(0,2)^4}\cdot\sqrt[5]{(0,1)^5}}{\sqrt{0,3)^3}}$

$=\frac{(0,2)\cdot(0,1)}{(0,3)}$

$=\frac{1}{15}$

Yanıt / Answer E

6. $\frac{\sqrt{2}-\frac{3}{\sqrt{2}}}{\sqrt{2}+\frac{3}{\sqrt{2}}}=\frac{\frac{2-3}{\sqrt{2}}}{\frac{2+3}{\sqrt{2}}}=-\frac{1}{5}$

Yanıt / Answer A

7. $\sqrt{\frac{36}{25}+\frac{49}{16}-\frac{21}{5}}=\sqrt{\left(\frac{6}{5}\right)^2-2\cdot\frac{6}{5}\cdot\frac{7}{4}+\left(\frac{7}{4}\right)^2}$

$=\sqrt{\left(\frac{6}{5}-\frac{7}{4}\right)^2}$

$=\left|\frac{6}{5}-\frac{7}{4}\right|=\frac{11}{20}$

Yanıt / Answer C

8. $\frac{\sqrt{3}\cdot\sqrt[3]{3}\cdot\sqrt[4]{3}}{\sqrt[6]{243}}=\frac{3^{\frac{1}{2}+\frac{1}{3}+\frac{1}{4}}}{3^{\frac{5}{6}}}$

$=\frac{3^{\frac{13}{12}}}{3^{\frac{5}{6}}}=3^{\frac{13}{12}-\frac{5}{6}}=3^{\frac{1}{4}}=\sqrt[4]{3}$

Yanıt / Answer E

9. $\sqrt{x-\sqrt{x-\sqrt{x\ldots}}}=9$

$\swarrow\ \searrow$

$9\quad(9+1)$

$\Rightarrow\ x=9\cdot 10=90$

Yanıt / Answer B

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10. $\sqrt[3]{5\cdot\sqrt[4]{x}}=\sqrt[3]{25}\cdot\sqrt[4]{5}$

$$\left(\sqrt[3]{5\cdot\sqrt[4]{x}}\right)^{12}=\left(\sqrt[3]{25}\cdot\sqrt[4]{5}\right)^{12}$$

$$5^4\cdot x=(5^2)^4\cdot 5^3$$

$$5^4\cdot x=5^{11}\ \Rightarrow\ x=5^7$$

Yanıt / Answer D

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11. $\left.\begin{array}{l}\sqrt{x+3}-\sqrt{x+1}=4\\ \sqrt{x+3}+\sqrt{x+1}=A\end{array}\right\}$

$$\Rightarrow\ A\cdot 4=\left(\sqrt{x+3}+\sqrt{x+1}\right)\cdot\left(\sqrt{x+3}-\sqrt{x+1}\right)$$

$$4\cdot A=x+3-x-1$$

$$4\cdot A=2\ \Rightarrow\ A=\frac{1}{2}$$

Yanıt / Answer B

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12. $\dfrac{\sqrt{3}-1}{\sqrt{6}+\sqrt{3}-\sqrt{2}-1}=\dfrac{\sqrt{3}-1}{\sqrt{3}\left(\sqrt{2}+1\right)-\left(\sqrt{2}+1\right)}$

$$=\frac{\sqrt{3}-1}{\left(\sqrt{2}+1\right)\cdot\left(\sqrt{3}-1\right)}$$

$$=\frac{1}{\underset{(\sqrt{2}-1)}{\sqrt{2}+1}}$$

$$=\frac{\sqrt{2}-1}{2-1}=\sqrt{2}-1$$

Yanıt / Answer A

---

13. $\dfrac{A}{B}+\dfrac{B}{A}=\dfrac{\sqrt{3}+2}{\underset{(\sqrt{3}+2)}{\sqrt{3}-2}}+\dfrac{\sqrt{3}-2}{\underset{(\sqrt{3}-2)}{\sqrt{3}+2}}$

$$=\frac{3+4\sqrt{3}+4}{3-4}+\frac{3-4\sqrt{3}+4}{3-4}$$

$$=-7-4\sqrt{3}-7+4\sqrt{3}=-14$$

Yanıt / Answer A

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14. $\sqrt{3-\sqrt{5}}-\sqrt{3+\sqrt{5}}$

$$=\frac{\sqrt{6-2\sqrt{5}}}{\sqrt{2}}-\frac{\sqrt{6+2\sqrt{5}}}{\sqrt{2}}$$

$$=\frac{\sqrt{5}-1}{\sqrt{2}}-\frac{\sqrt{5}+1}{\sqrt{2}}=\frac{\sqrt{5}-1-\sqrt{5}-1}{\sqrt{2}}$$

$$=\frac{-2}{\sqrt{2}}=-\sqrt{2}$$

Yanıt / Answer C

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15. $A=\sqrt{42+\sqrt{42+\sqrt{42\ldots}}}=7$

$\swarrow\ \searrow$

$7\quad 6$

$B=\sqrt[4]{8\sqrt[4]{8\sqrt[4]{8\ldots}}}=\sqrt[3]{8}=2$

$\Rightarrow\ A\cdot B=7\cdot 2=14$

Yanıt / Answer D

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16. $\sqrt{(\sqrt{5}-2)^2}-\sqrt{(1-\sqrt{5})^2}=|\sqrt{5}-2|-|1-\sqrt{5}|$

$$=(\sqrt{5}-2)-(-1+\sqrt{5})$$

$$=\sqrt{5}-2+1-\sqrt{5}$$

$$=-1$$

Yanıt / Answer A

1. $\sqrt{\frac{28}{81}+\frac{1}{3}\sqrt{7+\sqrt{\frac{1}{81}}}} = ?$

A) $\frac{7}{9}$ B) $\frac{8}{9}$ C) 1 D) $\frac{10}{9}$ E) $\frac{11}{9}$

2. $\sqrt{5} = x \Rightarrow \sqrt[3]{25} = ?$

A) $\sqrt[3]{x^2}$ B) $\sqrt{x}$ C) x D) $x\sqrt{x}$ E) $x\sqrt[3]{x}$

3. $\frac{\sqrt{3}+3\sqrt{12}-2\sqrt{48}}{\sqrt{108}-\sqrt{27}+\sqrt{75}} = ?$

A) $-\frac{1}{8}$ B) $-\frac{1}{6}$ C) $-\frac{1}{3}$ D) $\frac{1}{6}$ E) $\frac{1}{8}$

4. $x = \frac{\sqrt{3}-2}{2} \Rightarrow x(x+2) = ?$

A) $-\frac{1}{8}$ B) $-\frac{1}{4}$ C) $-\frac{1}{2}$ D) $\frac{1}{4}$ E) $\frac{1}{2}$

5. $\sqrt{\frac{0,0075}{0,12}} - \sqrt{\frac{0,0072}{0,32}} = ?$

A) $\frac{3}{5}$ B) $\frac{1}{5}$ C) $\frac{1}{10}$ D) $\frac{1}{15}$ E) $\frac{4}{5}$

6. $15^{x-1} = \sqrt{9^{x+2}} \Rightarrow 5^x = ?$

A) 9 B) 27 C) 81 D) 135 E) 243

7. $\sqrt{7-2\sqrt{6}} - \sqrt{10+4\sqrt{6}} = ?$

A) –3 B) –2 C) –1 D) $-\sqrt{6}$ E) $\sqrt{6}$

8. $\sqrt{64\sqrt{\frac{1}{4}\sqrt[3]{16}}} = 2^x \Rightarrow x = ?$

A) $\frac{17}{6}$ B) $\frac{17}{5}$ C) $\frac{17}{4}$ D) $\frac{17}{3}$ E) $\frac{17}{2}$

9. $\sqrt[4]{6-\sqrt{20}} \cdot \sqrt{1+\sqrt{5}} = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

10. $x \in N$,

$\sqrt{x+\sqrt{x^2-1}} - \sqrt{x-\sqrt{x^2-1}} = 8 \Rightarrow$ **x = ?**

A) 15 B) 17 C) 19 D) 31 E) 33

11. $\sqrt{7+\sqrt[4]{8\cdot\sqrt[4]{8}}}\ \ldots + \sqrt[3]{x:\sqrt[3]{x:\sqrt[3]{x\ldots}}} = 5$

$\Rightarrow$ **x = ?**

A) 1 B) 2 C) 4 D) 8 E) 16

12. $\sqrt{2-\sqrt[4]{15}} \cdot \sqrt{2+\sqrt[4]{15}} \cdot (\sqrt{10}+\sqrt{6}) = ?$

A) 1 B) 2 C) 4 D) 8 E) 16

13. $\dfrac{6}{\sqrt{3}} - \dfrac{1}{\sqrt{3}-2} + \dfrac{4}{\sqrt{3}+1} = ?$

A) $-3\sqrt{3}$ B) $-2\sqrt{3}$ C) $\sqrt{3}$

D) $3\sqrt{3}$ E) $5\sqrt{3}$

14. $\dfrac{\sqrt{\dfrac{9}{2}+3\sqrt{2}}}{\sqrt{3}(\sqrt{2}+1)} = ?$

A) $\sqrt{2}$ B) 1 C) $\dfrac{\sqrt{2}}{2}$ D) $\dfrac{\sqrt{3}}{2}$ E) $\sqrt{2}-1$

15. $A \in R$

$A = \dfrac{\sqrt{x-5}+\sqrt{6-x}+4}{\sqrt{x-6}+2x+3} \Rightarrow$ **A = ?**

A) $\dfrac{1}{6}$ B) $\dfrac{1}{4}$ C) $\dfrac{1}{3}$ D) $\dfrac{1}{2}$ E) 1

16. $\sqrt{x+1} = \sqrt[3]{x+1}$

eşitliğini sağlayan x'lerin çarpımı nedir?

According to the equation, what is the value of multiplication of x?

A) –1 B) 0 C) 1 D) 2 E) 3

[AKDENİZ ÜNV. YÖS 2013]

Yanıtlar / Answers

1. D	4. B	7. A	10. E	13. E	16. B
2. E	5. C	8. A	11. E	14. C	
3. A	6. D	9. B	12. B	15. C	

1. $\sqrt{\frac{28}{81}+\frac{1}{3}\sqrt{7+\sqrt{\frac{1}{81}}}} = \sqrt{\frac{28}{81}+\frac{1}{3}\sqrt{7+\frac{1}{9}}}$

$= \sqrt{\frac{28}{81}+\frac{1}{3}\cdot\frac{8}{3}}$

$= \sqrt{\frac{28}{81}+\frac{8}{9}}$

$= \sqrt{\frac{100}{81}} = \frac{10}{9}$

Yanıt / Answer D

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2. $\sqrt{5} = x$

$\sqrt[3]{25} = 5^{\frac{2}{3}} = (5^{\frac{1}{2}})^{\frac{4}{3}} = x^{\frac{4}{3}} = x\sqrt[3]{x}$

Yanıt / Answer E

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3. $\frac{\sqrt{3}+3\sqrt{12}-2\sqrt{48}}{\sqrt{108}-\sqrt{27}+\sqrt{75}} = \frac{\sqrt{3}+3\cdot 2\sqrt{3}-2\cdot 4\sqrt{3}}{6\sqrt{3}-3\sqrt{3}+5\sqrt{3}}$

$= \frac{\sqrt{3}\,(1+6-8)}{\sqrt{3}\,(6-3+5)}$

$= -\frac{1}{8}$

Yanıt / Answer A

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4. $x\cdot(x+2) = \left(\frac{\sqrt{3}-2}{2}\right)\cdot\left(\frac{\sqrt{3}-2}{2}+2\right)$

$= \left(\frac{\sqrt{3}-2}{2}\right)\cdot\left(\frac{\sqrt{3}+2}{2}\right)$

$= \frac{3-4}{4} = -\frac{1}{4}$

Yanıt / Answer B

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5. $\sqrt{\frac{0{,}0075}{0{,}12}} - \sqrt{\frac{0{,}0072}{0{,}32}} = \frac{\frac{5\sqrt{3}}{100}}{\frac{2\sqrt{3}}{10}} - \frac{\frac{6\sqrt{2}}{100}}{\frac{4\sqrt{2}}{10}}$

$= \frac{1}{4} - \frac{3}{20} = \frac{1}{10}$

Yanıt / Answer C

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6. $15^{x-1} = 3^{x+2}$

$15^{x}\cdot\frac{1}{15} = 3^{x}\cdot 9 \Rightarrow 5^{x} = 15\cdot 9 \Rightarrow 5^{x} = 135$

Yanıt / Answer D

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7. $\sqrt{7-2\sqrt{6}} - \sqrt{10+4\sqrt{6}} = \underset{6\quad 1}{\underset{\swarrow\ \searrow}{\sqrt{7-2\sqrt{6}}}} - \underset{6\quad 4}{\underset{\swarrow\ \searrow}{\sqrt{10+2\sqrt{24}}}}$

$= (\sqrt{6}-1) - (\sqrt{6}+2)$

$= -1-2 = -3$

Yanıt / Answer A

---

8. $\sqrt{64\sqrt{\frac{1}{4}\sqrt[3]{16}}} = \sqrt[12]{64^{6}\cdot\left(\frac{1}{4}\right)^{3}\cdot 16}$

$= \sqrt[12]{2^{36}\cdot 2^{-6}\cdot 2^{4}}$

$= \sqrt[12]{3^{34}}$

$= 2^{\frac{34}{12}} = 2^{x} \Rightarrow x = \frac{17}{6}$

Yanıt / Answer A

9. $\sqrt{6-\sqrt{20}}\cdot\sqrt{1+\sqrt5}=\sqrt[4]{6-2\underset{\swarrow\ \searrow \atop 5\quad 1}{\sqrt5}}\cdot\sqrt{1+\sqrt5}$

$=\sqrt{\sqrt5-1}\cdot\sqrt{1+\sqrt5}$

$=\sqrt{5-1}$

$=2$

Yanıt / Answer B

10. $\sqrt{x+\sqrt{x^2-1}}-\sqrt{x-\sqrt{x^2-1}}=8$

$\dfrac{\sqrt{2x+2\sqrt{x^2-1}}}{\sqrt2}-\dfrac{\sqrt{2x-2\sqrt{x^2-1}}}{\sqrt2}=8$

$\dfrac{\sqrt{x+1}+\sqrt{x-1}-\sqrt{x+1}+\sqrt{x-1}}{\sqrt2}=8$

$2\sqrt{x-1}=8\sqrt2 \Rightarrow x-1=32$

$x=33$

Yanıt / Answer E

11. $\sqrt{7+\sqrt[4]{8\cdot\sqrt[4]{8\ldots}}}+\sqrt[3]{x:\sqrt[3]{x:\sqrt[3]{x\ldots}}}=5$

$\sqrt{7+\sqrt[3]{8}}+\sqrt[4]{x}=5$

$3+\sqrt[4]{x}=5$

$\sqrt[4]{x}=2$

$x=16$

Yanıt / Answer E

12. $\sqrt{2-\sqrt[4]{15}}\cdot\sqrt{2+\sqrt[4]{15}}\cdot(\sqrt{10}+\sqrt6)$

$=\sqrt{4-\sqrt{15}}\cdot\sqrt2\cdot(\sqrt5+\sqrt3)$

$=(\sqrt5-\sqrt3)\cdot(\sqrt5+\sqrt3)$

$=5-3=2$

Yanıt / Answer B

13. $\underset{(\sqrt3)}{\dfrac{6}{\sqrt3}}-\underset{(\sqrt3+2)}{\dfrac{1}{\sqrt3-2}}+\underset{(\sqrt3-1)}{\dfrac{4}{\sqrt3+1}}$

$=\dfrac{6\sqrt3}{3}-\dfrac{\sqrt3+2}{-1}+\dfrac{4\sqrt3-4}{2}$

$=2\sqrt3+\sqrt3+2+2\sqrt3-2$

$=5\sqrt3$

Yanıt / Answer E

14. $\dfrac{\sqrt{\dfrac92+3\sqrt2}}{\sqrt3\cdot(\sqrt2+1)}=\dfrac{\sqrt{\dfrac{9+2\sqrt{18}}{2}}}{\sqrt3\cdot(\sqrt2+1)}$

$=\dfrac{\dfrac{\sqrt6+\sqrt3}{\sqrt2}}{\sqrt6+\sqrt3}$

$=\dfrac{1}{\sqrt2}=\dfrac{\sqrt2}{2}$

Yanıt / Answer C

15. $\left.\begin{array}{l}6-x\ge0 \Rightarrow 6\ge x\\ x-6\ge0 \Rightarrow x\ge6\end{array}\right\}\Rightarrow x=6$

$A=\dfrac{\sqrt{6-5}+\sqrt{6-6}+4}{\sqrt{6-6}+2\cdot6+3}$

$=\dfrac{\sqrt{6-5}+4}{2\cdot6+3}=\dfrac{5}{15}=\dfrac13$

Yanıt / Answer C

16. $\left(\sqrt{x+1}\right)^6=\left(\sqrt[3]{x+1}\right)^6$

$(x+1)^3-(x+1)^2=0$

$(x+1)^2\cdot[x+1-1]=0$

$x_1=-1,\ x_2=0$

$\Rightarrow x_1\cdot x_2=-1\cdot0=0$

Yanıt / Answer B

1. $\sqrt{243} - \sqrt{147} + \sqrt{\dfrac{27}{4}} = ?$

A) $3\sqrt{3}$ B) $4\sqrt{3}$ C) $\dfrac{7\sqrt{3}}{2}$ D) $\dfrac{9\sqrt{3}}{2}$ E) $\dfrac{11\sqrt{3}}{2}$

2. $A = \sqrt{25} - \sqrt{(-5)^2} + \sqrt[4]{(-3)^4} - \sqrt[3]{(-3)^3} \Rightarrow A = ?$

A) 16 B) 8 C) 7 D) 6 E) 0

3. $B = \sqrt{8{,}1} + \sqrt{0{,}9} + \sqrt{19{,}6} - \sqrt{12{,}1} \Rightarrow B = ?$

A) $\dfrac{\sqrt{10}}{2}$ B) $\dfrac{3\sqrt{10}}{2}$ C) $2\sqrt{10}$ D) $\dfrac{3}{2}$ E) 3

4. $\dfrac{\sqrt{150} \cdot \sqrt{72}}{\sqrt{300}} = ?$

A) 10 B) 9 C) 8 D) 7 E) 6

5. $\dfrac{1}{\sqrt{6}-1} - \dfrac{1}{\sqrt{6}+1} = ?$

A) $\dfrac{1}{\sqrt{6}}$ B) $\dfrac{\sqrt{6}}{2}$ C) $\dfrac{1}{6}$

D) 3 E) $\dfrac{2}{5}$

6. $\dfrac{\sqrt{5} - \dfrac{1}{\sqrt{5}}}{\sqrt{5} + \dfrac{1}{\sqrt{5}}} = ?$

A) $\dfrac{2}{3}$ B) $\dfrac{1}{3}$ C) 1

D) 2 E) 5

7. $\sqrt[3]{x} \cdot \sqrt[6]{3} = \sqrt[3]{3\sqrt{2}} \Rightarrow x = ?$

A) 1 B) $\sqrt{2}$ C) $\sqrt{6}$

D) $2\sqrt{3}$ E) $3\sqrt{2}$

8. $\dfrac{2+\sqrt{2}+\sqrt{3}+\sqrt{6}}{\sqrt{2}+1} = ?$

A) $\sqrt{3}+2$ B) $\sqrt{3}$ C) $\sqrt{2}+\sqrt{3}$

D) $2+\sqrt{2}$ E) $\sqrt{2}$

9. $\sqrt{\dfrac{3}{4}}+\sqrt{\dfrac{1}{12}}-\sqrt{\dfrac{4}{3}}=?$

A) -1 B) 0 C) 1 D) $\sqrt{3}$ E) $2\sqrt{3}$

10. $\sqrt{a}+\sqrt{b}=13$,
$a-b=39 \Rightarrow$ **a = ?**

A) $\sqrt{2}$ B) 2 C) $2\sqrt{2}$ D) 8 E) 64

11. $\sqrt{502\cdot 592-622\cdot 472}=?$

A) 20 B) 30 C) 40 D) 50 E) 60

12. $\sqrt{\dfrac{144}{25}+\dfrac{25}{144}-2}=?$

A) $\dfrac{49}{60}$ B) $-\dfrac{79}{60}$ C) $\dfrac{119}{60}$ D) $-\dfrac{119}{60}$ E) $\dfrac{119}{120}$

13. $x>0$,
$\sqrt{2x+5}-\sqrt{5}=x \Rightarrow \sqrt{2x+5}+\sqrt{5}=?$

A) 2 B) 3 C) 4 D) 5 E) 6

14. $a=\dfrac{\sqrt{5}-1}{\sqrt{3}+1} \Rightarrow \dfrac{\sqrt{3}-1}{\sqrt{5}+1}=?$

A) a B) $\dfrac{a}{2}$ C) $\dfrac{1}{a}$ D) $\dfrac{2}{a}$ E) $\dfrac{3}{a}$

15. $\sqrt[4]{10+\sqrt{45-\sqrt{x}}}=2 \Rightarrow$ **x = ?**

A) 16 B) 25 C) 49 D) 64 E) 81

16. $x \in R^{+}$
$\Rightarrow \dfrac{\sqrt[4]{x^3}\cdot\sqrt[3]{x^4}}{\sqrt[12]{x^{24}}}=?$

A) $\sqrt[7]{x^{12}}$ B) $\sqrt[4]{x^{12}}$ C) $\sqrt{x^5}$ D) $\sqrt[12]{x}$ E) $\sqrt[12]{x^7}$

[YTÜ-YÖS 2012]

Yanıtlar / Answers

1. C	4. E	7. C	10. E	13. A	16. D
2. D	5. E	8. C	11. E	14. B	
3. B	6. A	9. B	12. C	15. E	

1. $\sqrt{243}-\sqrt{147}+\sqrt{\dfrac{27}{4}}=9\sqrt{3}-7\sqrt{3}+\dfrac{3}{2}\sqrt{3}$

$=\dfrac{7\sqrt{3}}{2}$

Yanıt / Answer C

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2. $\sqrt{25}-\sqrt{(-5)^2}+\sqrt[4]{(-3)^4}-\sqrt[3]{(-3)^3}$

$=5-|-5|+|-3|-(-3)$

$=5-5+3+3=6$

Yanıt / Answer D

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3. $B=\sqrt{8{,}1}+\sqrt{0{,}9}+\sqrt{19{,}6}-\sqrt{12{,}1}$

$=\dfrac{9}{\sqrt{10}}+\dfrac{3}{\sqrt{10}}+\dfrac{14}{\sqrt{10}}-\dfrac{11}{\sqrt{10}}$

$=\dfrac{15}{\sqrt{10}}=\dfrac{15\sqrt{10}}{10}=\dfrac{3\sqrt{10}}{2}$

Yanıt / Answer B

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4. $\dfrac{\sqrt{150}\cdot\sqrt{72}}{\sqrt{300}}=\dfrac{5\sqrt{6}\cdot 6\sqrt{2}}{10\sqrt{3}}$

$=\dfrac{30\cdot\sqrt{12}}{10\sqrt{3}}$

$=3\cdot 2=6$

Yanıt / Answer E

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5. $\dfrac{1}{\sqrt{6}-1}-\dfrac{1}{\sqrt{6}+1}=\dfrac{\sqrt{6}+1-\sqrt{6}+1}{6-1}=\dfrac{2}{5}$

Yanıt / Answer E

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6. $\dfrac{\sqrt{5}-\dfrac{1}{\sqrt{5}}}{\sqrt{5}+\dfrac{1}{\sqrt{5}}}=\dfrac{\dfrac{4}{\sqrt{5}}}{\dfrac{6}{\sqrt{5}}}=\dfrac{2}{3}$

Yanıt / Answer A

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7. $\sqrt[3]{x}\cdot\sqrt[6]{3}=\sqrt[3]{3\sqrt{2}}$

$x^{\frac{1}{3}}\cdot 3^{\frac{1}{6}}=\sqrt[6]{3^2\cdot 2}$

$x^{\frac{1}{3}}\cdot 3^{\frac{1}{6}}=3^{\frac{2}{6}}\cdot 2^{\frac{1}{6}}$

$x^{\frac{1}{3}}=6^{\frac{1}{6}}\Rightarrow x=\sqrt{6}$

Yanıt / Answer C

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8. $\dfrac{2+\sqrt{2}+\sqrt{3}+\sqrt{6}}{\sqrt{2}+1}=\dfrac{\sqrt{2}(\sqrt{2}+1)+\sqrt{3}(1+\sqrt{2})}{\sqrt{2}+1}$

$=\dfrac{(\sqrt{2}+1)\cdot(\sqrt{2}+\sqrt{3})}{(\sqrt{2}+1)}$

$=\sqrt{2}+\sqrt{3}$

Yanıt / Answer C

9.

$$\sqrt{\frac{3}{4}}+\sqrt{\frac{1}{12}}-\sqrt{\frac{4}{3}}=\frac{\sqrt{3}}{2}+\frac{\sqrt{3}}{6}-\frac{2}{\sqrt{3}}$$

$$=\underset{(3)}{\frac{\sqrt{3}}{2}}+\frac{\sqrt{3}}{6}-\underset{(2)}{\frac{2\sqrt{3}}{3}}$$

$$=\frac{3\sqrt{3}+\sqrt{3}-4\sqrt{3}}{6}=0$$

Yanıt / Answer B

10.

$$a-b=39 \Rightarrow \underbrace{(\sqrt{a}-\sqrt{b})}_{3}\cdot\underbrace{(\sqrt{a}+\sqrt{b})}_{13}=39$$

$$\begin{array}{rl} & \sqrt{a}-\sqrt{b}=3 \\ + & \sqrt{a}+\sqrt{b}=13 \\ \hline & 2\sqrt{a}=16 \Rightarrow \sqrt{a}=8 \end{array}$$

$$a=64$$

Yanıt / Answer E

11.

$$\sqrt{502\cdot 592-622\cdot 472}$$

$$x=502 \Rightarrow \sqrt{x(x+90)-(x+120)(x-30)}$$

$$=\sqrt{x^2+90x-(x^2+90x-3600)}$$

$$=\sqrt{x^2+90x-x^2-90x+3600}$$

$$=\sqrt{3600}=60$$

Yanıt / Answer E

12.

$$\sqrt{\frac{144}{25}+\frac{25}{144}-2}=\sqrt{\left(\frac{12}{5}-\frac{5}{12}\right)^2}$$

$$=\left|\frac{12}{5}-\frac{5}{12}\right|$$

$$=\frac{119}{60}$$

Yanıt / Answer C

13.

$$\left.\begin{array}{l}\sqrt{2x+5}-\sqrt{5}=x \\ \sqrt{2x+5}+\sqrt{5}=A\end{array}\right\} \Rightarrow A\cdot x=2x+5-5$$

$$A\cdot x=2x$$

$$A=2$$

Yanıt / Answer A

14.

$$a=\frac{\sqrt{5}-1}{\sqrt{3}+1}\quad,\quad \frac{\sqrt{3}-1}{\sqrt{5}+1}=x$$

$$\Rightarrow x\cdot\frac{1}{a}=\frac{\sqrt{3}-1}{\sqrt{5}+1}\cdot\frac{\sqrt{3}+1}{\sqrt{5}-1}$$

$$\frac{x}{a}=\frac{2}{4} \Rightarrow x=\frac{a}{2}$$

Yanıt / Answer B

15.

$$\sqrt[4]{10+\sqrt{45-\sqrt{x}}}=2$$

$$10+\sqrt{45-\sqrt{x}}=16$$

$$\sqrt{45-\sqrt{x}}=6$$

$$45-\sqrt{x}=36$$

$$\sqrt{x}=9$$

$$x=81$$

Yanıt / Answer E

16.

$$\frac{\sqrt[4]{x^3}\cdot\sqrt[3]{x^4}}{\sqrt[12]{x^{24}}}=a$$

$$\left(\frac{\sqrt[4]{x^3}\cdot\sqrt[3]{x^4}}{\sqrt[12]{x^{24}}}\right)^{12}=a^{12}$$

$$\frac{(x^3)^3\cdot(x^4)^4}{x^{24}}=a^{12}$$

$$\frac{x^{25}}{x^{24}}=a^{12} \Rightarrow a=x^{\frac{1}{12}}=\sqrt[12]{x}$$

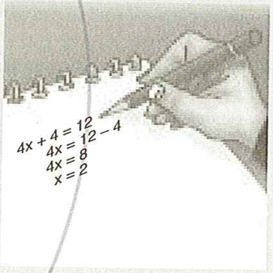
Yanıt / Answer D

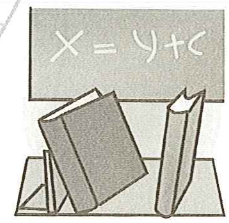
ÜNİTE 4
UNIT

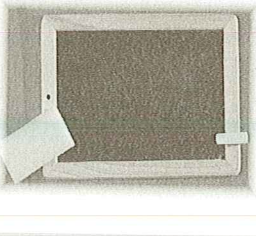
Johann Heinrich Lambert [1728 – 1777]

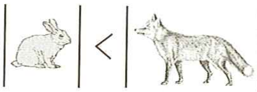
Johann Lambert, ilk defa π nin bir irrasyonel sayı olduğunu kesin olarak ispatlayan ünlü Fransız matematikçisidir.

Johann Lambert was the first to provide a rigorous proof that π is irrational.



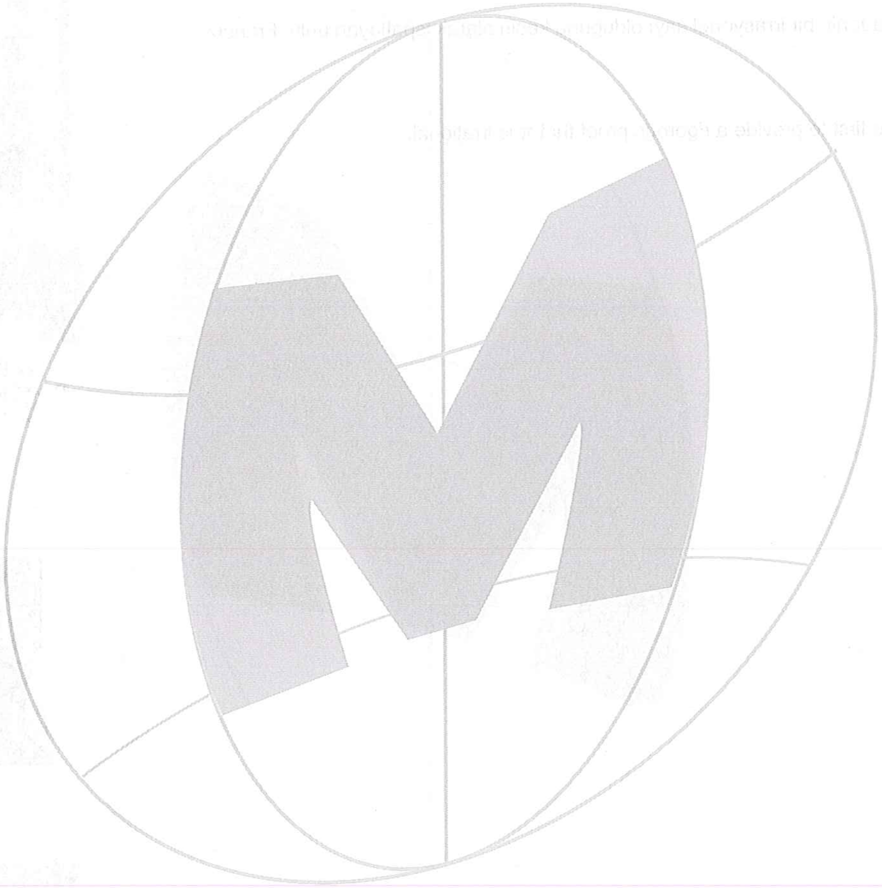






✓ **BİRİNCİ DERECEDEN DENKLEMLER** .... **129 – 144**
✓ **BİRİNCİ DERECEDEN EŞİTSİZLİKLER** .... **145 – 152**
✓ **MUTLAK DEĞER** .... **153 – 164**

✓ FIRST ORDER EQUATIONS .... 129 – 144
✓ FIRST ORDER INEQUALITIES .... 145 – 152
✓ ABSOLUTE VALUE .... 153 – 164



BİRİNCİ DERECEDEN DENKLEMLER
FIRST ORDER EQUATIONS

BÖLÜM
CHAPTER
1

Birinci Dereceden Denklemler / First Order Equations

Test 1

1. $2(x-3)-3(x-2)=7 \Rightarrow$ **x = ?**

A) –7 B) –5 C) 0 D) 5 E) 7

2. $5(2x-4)-4(x-2)=18 \Rightarrow$ **ÇK (SS) = ?**

A) {6} B) {5} C) {4} D) {3} E) {2}

3. $3x-[2\cdot(1-x)+x(x-1)]:(x-2)=5 \Rightarrow$ **x = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

4. $x-[-3x(x-1)-x]:x=2 \Rightarrow$ **x = ?**

A) –2 B) –1 C) 0 D) 1 E) 2

5. $x(1-2x)-2x(3-x)=3(x-1) \Rightarrow$ **x = ?**

A) $\frac{1}{8}$ B) $\frac{1}{4}$ C) $\frac{3}{8}$ D) $\frac{1}{2}$ E) $\frac{5}{8}$

6. $\frac{x}{2}-\frac{x-1}{3}-2-x=0 \Rightarrow$ **x = ?**

A) –2 B) –1 C) 0 D) 1 E) 2

7. $(x+2)^2-(x-2)^2=24 \Rightarrow$ **x = ?**

A) 0 B) 1 C) 2 D) 3 E) 4

8. $\frac{x-4}{2}-\frac{x-1}{3}=-1 \Rightarrow$ **ÇK(SS) = ?**

A) –6 B) –4 C) –1 D) 4 E) 6

9. $\dfrac{x-1,1\overline{6}}{0,\overline{3}}-x=\dfrac{33}{2} \Rightarrow \mathbf{x=?}$

A) –2 B) –1 C) 4 D) 6 E) 10

10. $\dfrac{x-4}{4}=6-\dfrac{2x+12}{9} \Rightarrow \mathbf{x=?}$

A) 8 B) 9 C) 10 D) 12 E) 14

11. $1-\dfrac{1}{1-\dfrac{1}{\dfrac{1}{x}-1}}=2 \Rightarrow \mathbf{x=?}$

A) $\dfrac{1}{2}$ B) $\dfrac{2}{3}$ C) $\dfrac{3}{2}$ D) $\dfrac{5}{2}$ E) $\dfrac{7}{2}$

12. $\dfrac{x}{x^2-x+\dfrac{1}{4}}-\dfrac{1}{x-\dfrac{1}{2}}=\dfrac{1}{x-\dfrac{1}{2}} \Rightarrow \mathbf{ÇK(SS)=?}$

A) $\varnothing$ B) $\left\{-\dfrac{1}{4}\right\}$ C) $\left\{-\dfrac{1}{2}\right\}$ D) $\left\{\dfrac{1}{4}\right\}$ E) {1}

13. $\left.\begin{array}{l}2x+y=11\\ x-2y=8\end{array}\right\} \Rightarrow \mathbf{ÇK(SS)=?}$

A) {(6, –1)} B) {(5,–1)} C) {(–1, 6)}
D) {(–1, 5)} E) {(6, 1)}

14. $\left.\begin{array}{l}ax+by=4\\ bx+ay=1\end{array}\right\}$ ve(and) ÇK(SS) = {(2,–1)}

$\Rightarrow \mathbf{a=?}$

A) 1 B) 2 C) 3 D) 4 E) 5

15. $\left.\begin{array}{l}\dfrac{x}{3}-\dfrac{y}{2}=1\\ \dfrac{x}{2}+\dfrac{y}{4}=6\end{array}\right\} \Rightarrow \mathbf{y=?}$

A) $\dfrac{9}{2}$ B) $\dfrac{11}{2}$ C) $\dfrac{13}{12}$ D) $\dfrac{5}{4}$ E) $\dfrac{17}{12}$

16. $x-y+2z=2$

$x-y+z=2$

$x+y-z=0$

$\Rightarrow \mathbf{y=?}$

A) –2 B) 2 C) 0
D) 1 E) –1

[AKDENİZ ÜNV. YÖS 2013]

Yanıtlar / Answers

1. A	4. D	7. D	10. D	13. A	16. E
2. B	5. C	8. D	11. B	14. C	
3. B	6. A	9. E	12. E	15. A	

1. $2(x-3)-3(x-2)=7$

$2x-6-3x+6=7$

$-x=7$

$x=-7$

Yanıt / Answer A

2. $5(2x-4)-4(x-2)=18$

$10x-20-4x+8=18$

$6x-12=18$

$6x=30$

$x=5$

$ÇK(SS)=\{5\}$

Yanıt / Answer B

3. $3x-[\,2(1-x)+x(x-1)\,]:(x-2)=5$

$3x-[\,-2(x-1)+x(x-1)\,]:(x-2)=5$

$3x-\dfrac{(x-1)(x-2)}{(x-2)}=5$

$3x-(x-1)=5$

$3x-x+1=5$

$2x=4$

$x=2$

Yanıt / Answer B

4. $x-[\,-3x(x-1)-x\,]:x=2$

$x-\dfrac{x[\,-3(x-1)-1\,]}{x}=2$

$x+3x-3+1=2$

$4x-2=2$

$4x=4$

$x=1$

Yanıt / Answer D

5. $x(1-2x)-2x(3-x)=3(x-1)$

$x-2x^2-6x+2x^2=3x-3$

$8x=3$

$x=\dfrac{3}{8}$

Yanıt / Answer C

6. $\dfrac{x}{2}-\dfrac{x-1}{3}-2-x=0$

$\dfrac{x}{\underset{(3)}{2}}-\dfrac{x-1}{\underset{(2)}{3}}-\dfrac{x}{\underset{(6)}{1}}=2$

$\dfrac{3x-2x+2-6x}{6}=2$

$2-5x=12$

$5x=-10$

$x=-2$

Yanıt / Answer A

7. $(x+2)^2-(x-2)^2=24$

$[(x+2)+(x-2)]\cdot[(x+2)-(x-2)]=24$

$2x\cdot 4=24$

$x=3$

Yanıt / Answer D

8. $\dfrac{x-4}{\underset{(3)}{2}}-\dfrac{x-1}{\underset{(2)}{3}}=-1$

$\dfrac{3x-12-2x+2}{6}=-1$

$x-10=-6$

$x=4$

Yanıt / Answer D

9.

$$\frac{x-1,1\overline{6}}{0,\overline{3}}-x=\frac{33}{2}$$

$$\frac{x-\frac{116-11}{90}}{\frac{3}{9}}-x=\frac{33}{2}$$

$$\left(x-\frac{7}{6}\right)\cdot 3-x=\frac{33}{2}$$

$$3x-\frac{7}{2}-x=\frac{33}{2}$$

$$2x=\frac{33}{2}+\frac{7}{2}$$

$$2x=20 \Rightarrow x=10$$

Yanıt / Answer E

10.

$$\frac{x-4}{4}=6-\frac{2x+12}{9}$$

$$\underset{(9)}{\frac{x-4}{4}}+\underset{(4)}{\frac{2x+12}{9}}=6$$

$$\frac{9x-36+8x+48}{36}=6$$

$$17x+12=6\cdot 36$$

$$x=12$$

Yanıt / Answer D

11.

$$1-\frac{1}{1-\frac{1}{\frac{1}{x}-1}}=2 \Rightarrow \frac{1}{1-\frac{1}{\frac{1}{x}-1}}=-1$$

$$1-\frac{1}{\frac{1}{x}-1}=-1 \Rightarrow \frac{1}{\frac{1}{x}-1}=2$$

$$\frac{1}{x}-1=\frac{1}{2} \Rightarrow \frac{1}{x}=\frac{3}{2} \Rightarrow x=\frac{2}{3}$$

Yanıt / Answer B

12.

$$\frac{x}{x^2-x+\frac{1}{4}}-\frac{1}{x-\frac{1}{2}}=\frac{1}{x-\frac{1}{2}}$$

$$\frac{x}{x^2-x+\frac{1}{4}}=\frac{1}{x-\frac{1}{2}}+\frac{1}{x-\frac{1}{2}}$$

$$\frac{x}{\left(x-\frac{1}{2}\right)^2}=\frac{2}{x-\frac{1}{2}}$$

$$\frac{x}{x-\frac{1}{2}}=\frac{2}{1} \Rightarrow x=2x-1 \Rightarrow x=$$

ÇK(SS) = {1}

Yanıt / Answer E

13.

$$\left.\begin{aligned} 2/\ \ 2x+y&=11 \\ x-2y&=8 \end{aligned}\right\} \Rightarrow \begin{aligned} 4x+2y&=22 \\ +\ \ x-2y&=8 \\ \hline 5x&=30 \end{aligned}$$

$$x=6$$

$$x-2y=8$$

$$6-2y=8 \Rightarrow y=-1$$

ÇK(SS) = { (6,–1) }

Yanıt / Answer A

14.

$$ax+by=4$$

$$bx+ay=1$$

$$\text{ÇK(SS)}=\{(2,-1)\} \Rightarrow x=2 \text{ ve(and) } y=-1$$

$$\left.\begin{aligned} a\cdot 2+b(-1)&=4 \\ b\cdot 2+a(-1)&=1 \end{aligned}\right\} \Rightarrow \begin{aligned} 2a-b&=4 \\ +\ \ 2/2b-a&=1 \\ \hline 3b&=6 \end{aligned}$$

$$b=2$$

$$2a-2=4 \Rightarrow 2a=6 \Rightarrow a=3$$

Yanıt / Answer C

15.

$$\left.\begin{aligned} -3/\ \ \frac{x}{3}-\frac{y}{2}&=1 \\ 2/\ \ \frac{x}{2}+\frac{y}{4}&=6 \end{aligned}\right\} \Rightarrow \begin{aligned} -x+\frac{3y}{2}&=-3 \\ +\ \ x+\frac{y}{2}&=12 \\ \hline 2y&=9 \end{aligned}$$

$$y=\frac{9}{2}$$

Yanıt / Answer A

16.

$$\begin{aligned} x-y+z&=2 \\ +\ \ x+y-z&=0 \\ \hline 2x&=2 \\ x&=1 \end{aligned} \qquad \begin{aligned} x-y+2z&=2 \\ -\ \ x-y+z&=2 \\ \hline z&=0 \end{aligned}$$

$$x+y-z=0$$

$$1+y-0=0 \Rightarrow y=-1$$

Yanıt / Answer E

1. $5(x-1)-4(x+3)=2x-7 \quad \Rightarrow \quad \mathbf{x=?}$

A) –10 B) –8 C) –7 D) 7 E) 10

2. $\dfrac{2x-3}{4}-\dfrac{x-5}{2}=x-\dfrac{x+2}{3} \quad \Rightarrow \quad \mathbf{x=?}$

A) $\dfrac{31}{4}$ B) $\dfrac{29}{4}$ C) $\dfrac{21}{4}$ D) $\dfrac{31}{8}$ E) $\dfrac{29}{8}$

3. $\dfrac{x-3}{ax}-\dfrac{x+1}{a}=x-4$

$ÇK(SS)=\{2\} \quad \Rightarrow \quad \mathbf{a=?}$

A) $\dfrac{5}{4}$ B) $\dfrac{7}{4}$ C) $\dfrac{9}{4}$ D) $\dfrac{5}{2}$ E) $\dfrac{7}{2}$

4. $\dfrac{x+2}{x-2}-\dfrac{2}{x^2-2x}-\dfrac{1}{x}=0 \quad \Rightarrow \quad \mathbf{ÇK(SS)=?}$

A) {0, –1} B) {1, –1} C) {–2}

D) {–1} E) Ø

5. $\dfrac{1}{x+1}+\dfrac{x-2}{x+2}+\dfrac{x}{x+1}=1 \quad \Rightarrow \quad \mathbf{x=?}$

A) –2 B) –1 C) 0 D) 1 E) 2

6. $\dfrac{x-6}{x^2-4}-\dfrac{2}{x+2}=\dfrac{3}{x-2} \quad \Rightarrow \quad \mathbf{ÇK(SS)=?}$

A) {–2} B) {–1} C) {0} D) {2} E) Ø

7. $\left.\begin{array}{l} 2x-y=3 \\ x+3y=19 \end{array}\right\} \Rightarrow \quad \mathbf{x+y=?}$

A) 6 B) 7 C) 8 D) 9 E) 10

8. $\left.\begin{array}{l} 3x-y=-6 \\ x+y=-2 \end{array}\right\} \Rightarrow \quad \mathbf{y=?}$

A) –2 B) –1 C) 0 D) 1 E) 2

9. $\left.\begin{array}{l}\dfrac{2}{x}-\dfrac{3}{y}=13\\[2mm] \dfrac{5}{x}+\dfrac{2}{y}=4\end{array}\right\} \Rightarrow \mathbf{x+y=?}$

A) $\dfrac{1}{9}$ B) $\dfrac{1}{6}$ C) $\dfrac{1}{3}$ D) $\dfrac{1}{2}$ E) 1

10. $x-4=\{3x+1-[2x-(x-1)]\} \Rightarrow$ **x = ?**

A) –4 B) –3 C) –2 D) –1 E) 1

11. $\dfrac{2x-3}{5}-\dfrac{x+1}{3}=-\dfrac{3}{5} \Rightarrow$ **x = ?**

A) 5 B) 4 C) 3 D) 2 E) 1

12. $ax+b^2=bx+a^2 \Rightarrow$ **ÇK(SS) = ?**

A) {–a – b} B) {–a + b} C) {a – b}
D) {a + b} E) Ø

13. $2ax-6x=18+3b$

ÇK(SS) = R $\Rightarrow$ **a + b = ?**

A) –5 B) –3 C) –2 D) 2 E) 3

14. $\left.\begin{array}{l}x-3y=5\\ -2x+6y=8\end{array}\right\} \Rightarrow$ **ÇK(SS) = ?**

A) Ø B) R C) {(0, 1)}
D) {(1, 0)} E) {0}

15. $(3x-y-8)^2+(2x+y+3)^2=0$

$\Rightarrow$ **x + y = ?**

A) –4 B) –2 C) –1 D) 1 E) 4

16. $\dfrac{2x-1}{3}-\dfrac{x-1}{4}=2 \Rightarrow$ **x = ?**

A) 1 B) 2 C) 3
D) 4 E) 5

[KTÜ. YÖS 2013]

Yanıtlar / Answers

1. A	4. D	7. D	10. A	13. B	16. E
2. E	5. E	8. C	11. A	14. A	
3. B	6. E	9. B	12. D	15. A	

1. $5(x-1)-4(x+3)=2x-7$

$5x-5-4x-12=2x-7$

$x-17=2x-7$

$x=-10$

Yanıt / Answer A

2. $\underset{(3)}{\frac{2x-3}{4}}-\underset{(6)}{\frac{x-5}{2}}=\underset{(12)}{\frac{x}{1}}-\underset{(4)}{\frac{x+2}{3}}$

$6x-9-6x+30=12x-4x-8$

$21=8x-8$

$29=8x$

$x=\frac{29}{8}$

Yanıt / Answer E

3. $\frac{x-3}{ax}-\frac{x+1}{a}=x-4$

$ÇK(SS)=2 \Rightarrow \frac{2-3}{2\cdot a}-\frac{2+1}{a}=2-4$

$\frac{-1}{2a}-\underset{(2)}{\frac{3}{a}}=-2$

$\frac{7}{2a}=2 \Rightarrow 4a=7 \Rightarrow a=\frac{7}{4}$

Yanıt / Answer B

4. $\frac{x+2}{x-2}-\frac{2}{x^2-2x}-\frac{1}{x}=0 \qquad (x\neq 0)$

$\underset{(x)}{\frac{x+2}{x-2}}-\underset{(1)}{\frac{2}{x(x-2)}}-\underset{(x-2)}{\frac{1}{x}}=0 \Rightarrow \frac{x^2+2x-2-x+2}{x(x-2)}=0$

$\frac{x^2+x}{x(x-2)}=0 \Rightarrow x^2+x=0 \Rightarrow x(x+1)=0$

$x=0$ veya(or) $x+1=0$

$x=-1$

$ÇK(SS)=\{-1\}$

Yanıt / Answer D

5. $\frac{1}{x+1}+\frac{x-2}{x+2}+\frac{x}{x+1}=1$

$\frac{x+1}{x+1}+\frac{x-2}{x+2}=1 \Rightarrow 1+\frac{x-2}{x+2}=1 \Rightarrow \frac{x-2}{x+2}=0$

$x-2=0 \Rightarrow x=2$

Yanıt / Answer E

6. $\frac{x-6}{x^2-4}-\frac{2}{x+2}=\frac{3}{x-2} \qquad (x\neq 2,\ x\neq -2)$

$\frac{x-6}{x^2-4}=\underset{(x+2)}{\frac{3}{x-2}}+\underset{(x-2)}{\frac{2}{x+2}}$

$\frac{x-6}{x^2-4}=\frac{3(x+2)+2(x-2)}{(x-2)(x+2)}$

$x-6=3x+6+2x-4$

$x-6=5x+2$

$-8=4x \Rightarrow x\neq -2 \Rightarrow ÇK(SS)=\varnothing$

Yanıt / Answer E

7. $3/\ 2x-y=3 \Rightarrow 6x-3y=9$

$x+3y=19 \qquad +\ \underline{x+3y=19}$

$7x=28 \Rightarrow x=4$

$x+3y=19 \Rightarrow 4+3y=19$

$3y=15 \Rightarrow y=5$

$\Rightarrow x+y=4+5=9$

Yanıt / Answer D

8. $3x-y=-6$

$+\ \underline{x+y=-2}$

$4x=-8 \Rightarrow x=-2$

$x+y=-2$

$-2+y=-2 \Rightarrow y=0$

Yanıt / Answer C

9. $2/\ \frac{2}{x}-\frac{3}{y}=13 \Rightarrow \frac{4}{x}-\frac{6}{y}=26$

$3/\ \frac{5}{x}+\frac{2}{y}=4 \Rightarrow \frac{15}{x}+\frac{6}{y}=12$

$\frac{19}{x}=38 \Rightarrow x=\frac{1}{2}$

$\frac{2}{x}-\frac{3}{y}=13 \Rightarrow \frac{2}{\frac{1}{2}}-\frac{3}{y}=13 \Rightarrow -\frac{3}{y}=9 \Rightarrow y=-\frac{1}{3}$

$\Rightarrow x+y=\frac{1}{2}-\frac{1}{3}=\frac{1}{6}$

Yanıt / Answer B

---

10. $x-4=\{3x+1-[2x-(x-1)]\}$

$x-4=\{3x+1-[2x-x+1]\}$

$x-4=[3x+1-(x+1)]$

$x-4=(3x+1-x-1)$

$x-4=2x \Rightarrow x=-4$

Yanıt / Answer A

---

11. $\frac{2x-3}{5}-\frac{x+1}{3}=\frac{-3}{5}$

$\frac{2x-3}{5}+\frac{3}{5}=\frac{x+1}{3} \Rightarrow \frac{2x}{5}=\frac{x+1}{3}$

$6x=5x+5$

$x=5$

Yanıt / Answer A

---

12. $ax+b^2=bx+a^2$

$ax-bx=a^2-b^2$

$x(a-b)=(a-b)\cdot(a+b)$

$x=a+b$

Yanıt / Answer D

---

13. $2ax-6x=18+3b$

$2ax-6x-18-3b=0$

$x(2a-6)-3(6+b)=0$

$ÇK(SS)=R \Rightarrow 2a-6=0$ ve (and) $6+b=0$

$2a=6 \qquad b=-6$

$a=3$

$\Rightarrow a+b=3+(-6)=-3$

Yanıt / Answer B

---

14. $\left.\begin{array}{l} 2/\ x-3y=5 \\ -2x+6y=8 \end{array}\right\} \Rightarrow \begin{array}{l} 2x-6y=10 \\ -2x+6y=8 \\ \hline \end{array}$

$0=18 \Rightarrow ÇK(SS)=\varnothing$

Yanıt / Answer A

---

15. $(3x-y-8)^2+(2x+y+3)^2=0$

$3x-y-8=0$

$+\ 2x+y+3=0$

$5x-5=0$

$5x=5 \Rightarrow x=1$

$3x-y-8=0 \Rightarrow 3\cdot1-y-8=0 \Rightarrow y=-5$

$\Rightarrow x+y=1+(-5)=-4$

Yanıt / Answer A

---

16. $\underset{(4)}{\frac{2x-1}{3}}-\underset{(3)}{\frac{x-1}{4}}=\frac{8x-4}{12}-\frac{3x-3}{12}$

$=\frac{8x-4-3x+3}{12}$

$=\frac{5x-1}{12}=2$

$\Rightarrow 5x-1=24$

$5x=25$

$x=5$

Yanıt / Answer E

1. $2x-[3x+1-2\cdot(x-1)]=-(x-5) \Rightarrow$ **$x=?$**

A) 1 B) 2 C) 3 D) 4 E) 5

2. $\dfrac{x+5}{3}-\dfrac{x-2}{5}=2+\dfrac{4x-1}{15} \Rightarrow$ **$x=?$**

A) –2 B) –1 C) 0 D) 1 E) 2

3. $\dfrac{4}{1+\dfrac{2}{1+\dfrac{x-1}{2}}}=2 \Rightarrow$ **$x=?$**

A) 1 B) 2 C) 3 D) 4 E) 5

4. $\dfrac{x}{x+1}+\dfrac{1}{x-\dfrac{1}{x}}-\dfrac{1}{x^2-1}=2x \Rightarrow$ **$x=?$**

A) –1 B) $-\dfrac{1}{2}$ C) $\dfrac{1}{2}$ D) 1 E) 2

5. $\dfrac{1+\dfrac{x}{2}}{1-\dfrac{x}{2}}-\dfrac{5}{x-2}=8 \Rightarrow$ **$x=?$**

A) 1 B) 2 C) 3 D) 4 E) 5

6. $\left.\begin{array}{l} a+b=12 \\ b-c=19 \end{array}\right\} \Rightarrow$ **$a+c=?$**

A) –8 B) –7 C) –6 D) –4 E) –3

7. $\left.\begin{array}{l} 2x-\dfrac{1}{y}=3 \\ 4x+\dfrac{2}{y}=5 \end{array}\right\} \Rightarrow$ **$y=?$**

A) –4 B) –3 C) –2 D) –1 E) 1

8. $\left.\begin{array}{l} a-2c=4 \\ b+3c=5 \\ 2a+b=6 \end{array}\right\} \Rightarrow$ **$a-c=?$**

A) –5 B) –4 C) –3 D) –2 E) –1

9. $\left.\begin{array}{l} 4x^2-\dfrac{y^2}{x^2}=12 \\ 2x-\dfrac{y}{x}=2 \end{array}\right\} \Rightarrow \mathbf{y=?}$

A) 2 B) 4 C) 6 D) 8 E) 12

10. $\left.\begin{array}{l} 7a-3b+6c=19 \\ 3a-4b+5c=10 \\ 5a+2b+2c=3 \end{array}\right\} \Rightarrow \mathbf{a+b+c=?}$

A) –7 B) –6 C) 3 D) 6 E) 7

11. $\left.\begin{array}{l} a+2b+3c=12 \\ a+4b+6c=18 \end{array}\right\} \Rightarrow \mathbf{a=?}$

A) 8 B) 7 C) 6 D) 5 E) 4

12. $1-\dfrac{1-\dfrac{1-\dfrac{x}{3}}{3}}{3}=1 \quad \Rightarrow \quad \mathbf{x=?}$

A) 6 B) 3 C) 0 D) –3 E) –6

13. $\left.\begin{array}{l} \dfrac{2}{x}+\dfrac{3}{y}=\dfrac{1}{3} \\ 3x+2y=-4 \end{array}\right\} \Rightarrow \mathbf{x\cdot y=?}$

A) –12 B) –8 C) –4 D) 8 E) 12

14. $\left.\begin{array}{l} 3x-2y=21 \\ 2x+y=7 \end{array}\right\} \Rightarrow \mathbf{x+y=?}$

A) 1 B) 2 C) 3 D) 4 E) 5

15. $(2x-3)(x+2)(2x-5)=0 \quad \Rightarrow \quad$ **ÇK(SS) = ?**

A) $\left\{\dfrac{3}{2}, -2, \dfrac{5}{2}\right\}$ B) $\left\{\dfrac{2}{3}, 2, \dfrac{2}{5}\right\}$

C) $\left\{-\dfrac{3}{2}, 2, -\dfrac{5}{2}\right\}$ D) $\left\{\dfrac{3}{2}, 2, \dfrac{5}{2}\right\}$

E) $\left\{\dfrac{2}{3}, -2, \dfrac{5}{2}\right\}$

16. $7x + 4y + z = 50$

$x + y + 2z = 10$

$2y - 3z = 5$

$\Rightarrow$ **x = ?**

A) –2 B) –4 C) –7

D) 3 E) 5

[YTÜ. YÖS 2013]

Yanıtlar / Answers

1. D	4. C	7. A	10. B	13. A	16. E
2. D	5. A	8. C	11. C	14. B	
3. C	6. B	9. B	12. E	15. A	

1. $2x - [3x + 1 - 2(x - 1)] = -(x - 5)$

$2x - (3x + 1 - 2x + 2) = -x + 5$

$2x - (x + 3) = -x + 5$

$2x - x - 3 = -x + 5$

$x - 3 = -x + 5 \Rightarrow 2x = 8 \Rightarrow x = 4$

Yanıt / Answer D

2. $\frac{x+5}{3} - \frac{x-2}{5} = 2 + \frac{4x-1}{15} \Rightarrow \underset{(5)}{\frac{x+5}{3}} - \underset{(3)}{\frac{x-2}{5}} - \underset{(1)}{\frac{4x-1}{15}} = 2$

$\frac{5x+25-3x+6-4x+1}{15} = 2$

$32 - 2x = 30 \Rightarrow 2x = 2 \Rightarrow x = 1$

Yanıt / Answer D

3. $\frac{4}{1+\frac{2}{1+\frac{x-1}{2}}} = 2 \Rightarrow 1 + \frac{2}{1+\frac{x-1}{2}} = 2 \Rightarrow \frac{2}{1+\frac{x-1}{2}} = 1$

$\Rightarrow 1 + \frac{x-1}{2} = 2 \Rightarrow \frac{x-1}{2} = 1 \Rightarrow x - 1 = 2 \Rightarrow x = 3$

Yanıt / Answer C

4. $\underset{(x-1)}{\frac{x}{x+1}} + \frac{1}{\frac{x}{\underset{(x)}{1}} - \frac{1}{x}} - \frac{1}{x^2-1} = 2x$

$\frac{x(x-1)}{(x-1)(x+1)} + \frac{1}{\frac{x^2-1}{x}} - \frac{1}{x^2-1} = 2x$

$\frac{x^2-x}{x^2-1} + \frac{x}{x^2-1} - \frac{1}{x^2-1} = 2x$

$\frac{x^2-x+x-1}{x^2-1} = 2x \Rightarrow \frac{x^2-1}{x^2-1} = 2x \Rightarrow 1 = 2x \Rightarrow x = \frac{1}{2}$

Yanıt / Answer C

5. $\frac{1+\frac{x}{2}}{1-\frac{x}{2}} - \frac{5}{x-2} = 8 \Rightarrow \frac{\frac{2+x}{2}}{\frac{2-x}{2}} - \frac{5}{x-2} = 8$

$\Rightarrow \frac{2+x}{2-x} + \frac{5}{2-x} = 8$

$\Rightarrow \frac{x+7}{2-x} = 8 \Rightarrow x + 7 = 16 - 8x$

$9x = 9 \Rightarrow x = 1$

Yanıt / Answer A

6.

$a + b = 12 \Rightarrow a + b = 12$

$-1/\ b - c = 19 \Rightarrow +\ \underline{-b + c = -19}$

$a + c = -7$

Yanıt / Answer B

7.

$-2/\ 2x - \frac{1}{y} = 3 \Rightarrow -4x + \frac{2}{y} = -6$

$4x + \frac{2}{y} = 5 \Rightarrow +\ \underline{4x + \frac{2}{y} = 5}$

$\frac{4}{y} = -1 \Rightarrow y = -4$

Yanıt / Answer A

8.

$-1/\ a - 2c = 4 \Rightarrow -a + 2c = -4$

$-1/\ b + 3c = 5 \Rightarrow -b - 3c = -5$

$2a + b = 6 \Rightarrow +\ \underline{2a + b = 6}$

$a - c = -3$

Yanıt / Answer C

9. $4x^2-\dfrac{y^2}{x^2}=12 \qquad 2x-\dfrac{y}{x}=2$

$$\underbrace{\left(2x-\frac{y}{x}\right)}_{2}\cdot\left(2x+\frac{y}{x}\right)=12\Rightarrow 2\cdot\left(2x+\frac{y}{x}\right)=12\Rightarrow 2x+\frac{y}{x}=6$$

$$\begin{array}{l} 2x-\dfrac{y}{x}=2 \\ +\ 2x+\dfrac{y}{x}=6 \\ \hline \quad 4x=8 \ \Rightarrow\ x=2 \end{array}$$

$$2x-\frac{y}{x}=2\ \Rightarrow\ 2\cdot2-\frac{y}{2}=2\ \Rightarrow\ 2=\frac{y}{2}\ \Rightarrow\ y=4$$

Yanıt / Answer B

10.

$$\begin{array}{lll} -1/\ 7a-3b+6c=19 & \Rightarrow & -7a+3b-6c=-19 \\ 3a-4b+5c=10 & \Rightarrow & 3a-4b+5c=10 \\ 5a+2b+2c=3 & \Rightarrow & +\ \ 5a+2b+2c=3 \\ \hline & & a+b+c=-6 \end{array}$$

Yanıt / Answer B

11.

$$\begin{array}{lll} 2/\ \ a+2b+3c=12 & \Rightarrow & 2a+4b+6c=24 \\ -1/\ \ a+4b+6c=18 & \Rightarrow & +\ -a-4b-6c=-18 \\ \hline & & a=6 \end{array}$$

Yanıt / Answer C

12.

$$1-\overbrace{\frac{1-\dfrac{1-\frac{x}{3}}{3}}{3}}^{=0}=1\ \Rightarrow\ \frac{\overbrace{1-\dfrac{1-\frac{x}{3}}{3}}^{=0}}{3}=0$$

$$1-\overbrace{\frac{1-\frac{x}{3}}{3}}^{=1}=0\ \Rightarrow\ \frac{\overbrace{1-\frac{x}{3}}^{=3}}{3}=1$$

$$1-\frac{x}{3}=3\ \Rightarrow\ \frac{x}{3}=-2\ \Rightarrow\ x=-6$$

Yanıt / Answer E

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13. $\underset{(y)}{\dfrac{2}{x}}+\underset{(x)}{\dfrac{3}{y}}=\dfrac{1}{3}$

$$\frac{2y+3x}{y\cdot x}=\frac{1}{3},\quad (2y+3x=-4)$$

$$\frac{-4}{yx}=\frac{1}{3}\ \Rightarrow\ yx=-12$$

Yanıt / Answer A

14.

$$\begin{array}{lll} 1/\ \ 3x-2y=21 & \Rightarrow & 3x-2y=21 \\ 2/\ \ 2x+y=7 & \Rightarrow & +\ 4x+2y=14 \\ \hline & & 7x=35\ \Rightarrow\ x=5 \end{array}$$

$2x+y=7$

$2\cdot5+y=7\ \Rightarrow\ y=-3$

$\Rightarrow\ x+y=5+(-3)=2$

Yanıt / Answer B

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15. $(2x-3)(x+2)(2x-5)=0$

$2x-3=0$ veya (or) $x+2=0$ veya (or) $2x-5=0$

$x=\dfrac{3}{2} \qquad x=-2 \qquad x=\dfrac{5}{2}$

$\text{ÇK(SS)}=\left\{-2,\dfrac{3}{2},\dfrac{5}{2}\right\}$

Yanıt / Answer A

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16. $x+y+2z=10 \Rightarrow 2x+2y+4z=20$

$$\begin{array}{l} 2x+2y+4z=20 \\ +\quad 2y-3z=5 \\ \hline 2x+4y+z=36 \end{array} \qquad \begin{array}{l} 7x+4y+z=50 \\ +\ -/\ 2x+4y+z=25 \\ \hline 5x=25 \\ x=5 \end{array}$$

Yanıt / Answer E

1. $\frac{3x+1}{2}-\frac{2x-3}{3}=-1 \Rightarrow$ **$x=?$**

A) –5 B) –3 C) –1 D) 3 E) 5

2. $2(3-2x)+x=-3(2x-1) \Rightarrow$ **$x=?$**

A) –2 B) –1 C) 1 D) 2 E) 3

3. $\frac{x+1}{x-1}-\frac{1}{x^2-x}-\frac{1}{x}=0 \Rightarrow$ **ÇK(SS) = ?**

A) {–1} B) {–1, 1} C) {–1, 0} D) {0} E) ∅

4. $\left.\begin{array}{l} ax+10y=2a \\ 5x+2ay=a+1 \end{array}\right\}$

ÇK(SS) = ∅ ve(and) $a\in N^+ \Rightarrow$ **$a=?$**

A) 1 B) 3 C) 4 D) 5 E) 7

5. $\frac{x+4}{3x-2}+\frac{x+4}{x}=\frac{3}{x}-\frac{4x^2+x}{2x-3x^2} \Rightarrow$ **ÇK(SS) = ?**

A) {1} B) $\left\{-\frac{1}{2}\right\}$ C) ∅ D) $\left\{\frac{1}{2}\right\}$ E) {2}

6. $a>0$,

$3x+(a-1)y+b=0$

$ax+4y+a+b=0$

ÇK(SS) = R ⇒ **(a, b) = ?**

A) (10, –4) B) (6, –2) C) (12, –4) D) (4, –12) E) (4, 12)

7. $\left.\begin{array}{l} 4a+5b+6c=14 \\ a+2b+3c=5 \end{array}\right\} \Rightarrow$ **$a+b+c=?$**

A) 1 B) 2 C) 3 D) 4 E) 5

8. $\left.\begin{array}{l} x+y=-7 \\ y-z=5 \\ z+m=3 \end{array}\right\} \Rightarrow$ **$2x+y-z-2m=?$**

A) –25 B) –23 C) –18 D) –11 E) –7

9. $\left.\begin{aligned} \frac{3}{x}-\frac{2}{y}&=-1 \\ \frac{2}{x}+\frac{1}{y}&=4 \end{aligned}\right\} \Rightarrow x+10y=?$

A) 4 B) 6 C) 8 D) 12 E) 14

10. $\frac{x^2-x-2}{x+1}=x-2 \quad \Rightarrow \text{ÇK(SS)}=?$

A) Ø B) {2} C) {–2} D) R E) R – {–1}

11. $\left.\begin{aligned} a+3b+2c&=2 \\ 2a+b-c&=7 \\ 3a+4b-3c&=5 \end{aligned}\right\} \Rightarrow c=?$

A) –3 B) –2 C) 1 D) 2 E) 3

12. $\left.\begin{aligned} \frac{2x+3y-4}{z}&=0 \\ y\cdot z&=0 \end{aligned}\right\} \Rightarrow x=?$

A) –3 B) –2 C) 1 D) 2 E) 3

13. $\frac{17}{16-\frac{x-4}{x-5}}=1 \quad \Rightarrow \quad x=?$

A) $\frac{3}{2}$ B) $\frac{5}{2}$ C) $\frac{7}{2}$ D) $\frac{9}{2}$ E) $\frac{11}{2}$

14. $\left.\begin{aligned} 2x-yz&=5 \\ 2y-xz&=5 \\ x-y&=6 \end{aligned}\right\} \Rightarrow z=?$

A) –4 B) –3 C) –2 D) 2 E) 3

15. $\frac{x}{5}-\frac{2x+1}{10}+\frac{x}{9}-\frac{3x-1}{27}=x+\frac{253}{270} \quad \Rightarrow x=?$

A) –1 B) 0 C) 1 D) 2 E) 3

[MÜYÖS 2012]

Yanıtlar / Answers

1. B	4. D	7. C	10. E	13. D
2. B	5. D	8. A	11. C	14. C
3. E	6. E	9. B	12. D	15. A

1. $\frac{3x+1}{\underset{(3)}{2}}-\frac{2x-3}{\underset{(2)}{3}}=-1$

$\frac{9x+3-4x+6}{6}=-1$

$5x+9=-6 \Rightarrow 5x=-15 \Rightarrow x=-3$

Yanıt / Answer B

2. $2(3-2x)+x=-3(2x-1)$

$6-4x+x=-6x+3$

$6-3x=-6x+3$

$3x=-3 \Rightarrow x=-1$

Yanıt / Answer B

3. $\frac{x+1}{\underset{(x)}{x-1}}-\frac{1}{\underset{(1)}{x^2-x}}-\frac{1}{\underset{(x-1)}{x}}=0 \quad (x\neq 0 \text{ ve (and) } x\neq 1)$

$\frac{x(x+1)}{x(x-1)}-\frac{1}{x(x-1)}-\frac{x-1}{x(x-1)}=0$

$\frac{x^2+x-1-x+1}{x(x-1)}=0$

$\frac{x^2}{x(x-1)}=0 \Rightarrow x\neq 0 \Rightarrow \text{ÇK(SS)}=\varnothing$

Yanıt / Answer E

4. $ax+10y=2a$

$5x+2ay=a+1$

$\text{ÇK(SS)}=\varnothing \Rightarrow \frac{a}{5}=\frac{10}{2a} \Rightarrow \frac{a}{5}=\frac{5}{a}$

$\Rightarrow a^2=25 \Rightarrow a=5$ veya(or) $a=-5$

$a\in N \Rightarrow a=5$

Yanıt / Answer D

5. $\frac{x+4}{3x-2}+\frac{x+4}{x}=\frac{3}{x}-\frac{4x^2+x}{2x-3x^2} \quad (x\neq 0)$

$\frac{x+4}{3x-2}+\frac{x+4}{x}=\frac{3}{x}+\frac{x(4x+1)}{x(3x-2)}$

$\frac{x+4}{3x-2}-\frac{4x+1}{3x-2}=\frac{3}{x}-\frac{x+4}{x}$

$\frac{x+4-4x-1}{3x-2}=\frac{3-x-4}{x} \Rightarrow \frac{3-3x}{3x-2}=\frac{-x-1}{x}$

$3x-3x^2=-3x^2-3x+2x+2$

$3x=-x+2 \Rightarrow 4x=2 \Rightarrow x=\frac{1}{2}$

$\Rightarrow \text{ÇK(SS)}=\left\{\frac{1}{2}\right\}$

Yanıt / Answer D

6. $3x+(a-1)y+b=0$

$ax+4y+a+b=0$

$\text{ÇK(SS)}=\text{IR} \Rightarrow \frac{3}{a}=\frac{a-1}{4}=\frac{b}{a+b}$

$\frac{3}{a}=\frac{a-1}{4} \Rightarrow a^2-a=12$

$a^2-a-12=0$

$a \quad -4$

$a \quad 3$

$(a-4)(a+3)=0$

$a-4=0$ veya(or) $a+3=0$

$a=4 \qquad a=-3$

$a>0 \Rightarrow a=4$

$\frac{3}{4}=\frac{b}{4+b} \Rightarrow 12+3b=4b \Rightarrow b=12$

$(a,b)=(4,12)$

Yanıt / Answer E

7. $4a+5b+6c=14 \Rightarrow 4a+5b+6c=14$

$-1/\ a+2b+3c=5 \Rightarrow \underline{+\ -a-2b-3c=-5}$

$3a+3b+3c=9$

$3(a+b+c)=9$

$a+b+c=3$

Yanıt / Answer C

8.

$$\begin{aligned} 2/\ x+y=-7 &\Rightarrow & 2x+2y=-14 \\ -1/\ y-z=5 &\Rightarrow & -y+z=-5 \\ -2/\ z+m=3 &\Rightarrow & +\ -2z-2m=-6 \\ & & \overline{2x+y-z-2m=-25} \end{aligned}$$

Yanıt / Answer A

9.

$$\frac{3}{x}-\frac{2}{y}=-1 \Rightarrow \frac{3}{x}-\frac{2}{y}=-1$$

$$2/\ \frac{2}{x}+\frac{1}{y}=4 \Rightarrow +\ \frac{4}{x}+\frac{2}{y}=8$$

$$\frac{7}{x}=7 \Rightarrow x=1$$

$$\frac{2}{x}+\frac{1}{y}=4 \Rightarrow \frac{2}{1}+\frac{1}{y}=4 \Rightarrow \frac{1}{y}=2 \Rightarrow y=\frac{1}{2}$$

$$\Rightarrow x+10y=1+10\cdot\frac{1}{2}=6$$

Yanıt / Answer B

10.

$$\frac{x^2-x-2}{x+1}=x-2 \Rightarrow \frac{(x-2)\cdot(x+1)}{x+1}=x-2$$

$$x-2=x-2 \Rightarrow \text{ÇK(SS)}=\mathbb{R}$$

$$x+1\neq 0 \Rightarrow x\neq -1$$

$$\Rightarrow \text{ÇK(SS)}=\mathbb{R}-\{-1\}$$

Yanıt / Answer E

11.

$$\begin{aligned} -1/\ \ a+3b+2c=2 &\Rightarrow -a-3b-2c=-2 \\ -1/\ \ 2a+b-c=7 &\Rightarrow -2a-b+c=-7 \\ 3a+4b-3c=5 &\Rightarrow +\ \underline{3a+4b-3c=5} \\ & \qquad -4c=-4 \Rightarrow c=1 \end{aligned}$$

Yanıt / Answer C

12.

$$\frac{2x+3y-4}{z}=0 \Rightarrow 2x+3y-4=0 \text{ ve (and) } z\neq 0$$

$$y\cdot z=0 \text{ ve (and) } z\neq 0 \Rightarrow y=0$$

$$2x+3y-4=0$$

$$\Rightarrow 2\cdot x+3\cdot 0-4=0 \Rightarrow 2x=4 \Rightarrow x=2$$

Yanıt / Answer D

13.

$$\frac{17}{\underbrace{16-\frac{x-4}{x-5}}_{=17}}=1 \Rightarrow 16-\underbrace{\frac{x-4}{x-5}}_{=-1}=17$$

$$\Rightarrow \frac{x-4}{x-5}=-1 \Rightarrow x-4=-x+5$$

$$\Rightarrow 2x=9 \Rightarrow x=\frac{9}{2}$$

Yanıt / Answer D

14.

$$\begin{aligned} 2x-yz&=5 \\ -\ \ 2y-xz&=5 \\ \hline 2x-yz-2y+xz&=0 \\ 2(x-y)+z(x-y)&=0 \\ \underbrace{(x-y)}_{6}(2+z)&=0 \end{aligned}$$

$$2+z=0 \Rightarrow z=-2$$

Yanıt / Answer C

15.

$$\frac{x}{\underset{(2)}{5}}-\frac{2x+1}{\underset{(1)}{10}}+\frac{x}{\underset{(3)}{9}}-\frac{3x-1}{\underset{(1)}{27}}=x+\frac{253}{270}$$

$$\frac{2x-2x-1}{10}+\frac{3x-3x+1}{27}=x+\frac{253}{270}$$

$$-\frac{1}{10}+\frac{1}{27}=x+\frac{253}{270}$$

$$-\frac{17}{270}=x+\frac{253}{270}$$

$$\frac{-253}{270}+\frac{-17}{270}=x$$

$$x=-1$$

Yanıt / Answer A

BİRİNCİ DERECEDEN EŞİTSİZLİKLER
FIRST ORDER INEQUALITIES

BÖLÜM
CHAPTER 2

Birinci Dereceden Denklemler / First Order Inequalities

Test 1

1. $x \in N^+$,

$3x - 11 \le 2x - 5 \Rightarrow \sum x = ?$

A) 15 B) 17 C) 18 D) 20 E) 21

2. $3 < 2x - 7 \le 5,\ x \in Z \Rightarrow x = ?$

A) 5 B) 6 C) 7 D) 8 E) 10

3. $2x + 5 > x + 5,\ x \in N \Rightarrow \min(x) = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

4. $3(x-4) - 4(3-x) \le 25,\ x \in Z \Rightarrow \max(x) = ?$

A) 5 B) 6 C) 7 D) 8 E) 9

5. $4x - 6 < 3x + 8 < 5x + 2,\ x \in N \Rightarrow \sum x = ?$

A) 65 B) 75 C) 85 D) 89 E) 103

6. $-15 - 3x \ge 0,\ x \in R \Rightarrow$ **ÇK(SS) = ?**

A) $(-\infty, 5]$ B) $(-\infty, -5]$ C) $(-\infty, 5)$

D) $(-\infty, -5)$ E) $[-5, \infty)$

7. $\dfrac{3-2x}{5} \le -11,\ x \in R \Rightarrow$ **ÇK(SS) = ?**

A) $(-29, \infty)$ B) $(-\infty, -29]$ C) $(-\infty, 29]$

D) $(29, \infty)$ E) $[29, \infty)$

8. $-2 < \dfrac{3x-5}{4} \le 3,$

$x \in R \Rightarrow$ **ÇK(SS) = ?**

A) $\left(-1, \dfrac{17}{3}\right)$ B) $\left(-1, \dfrac{17}{3}\right]$ C) $\left(3, \dfrac{17}{5}\right]$

D) $\left[-3, \dfrac{17}{3}\right)$ E) $\left(-5, \dfrac{17}{5}\right]$

9. $-2 \le \frac{7-3x}{4} \le 4,\ x \in Z \quad \Rightarrow \sum x = ?$

A) 4 B) 9 C) 12 D) 15 E) 18

10. $\left.\begin{array}{l} 3x-12 \le 3 \\ 2x+7 > 1 \end{array}\right\} \Rightarrow$ **ÇK(SS) = ?**

A) $-2 < x < 5$ B) $-2 \le x \le 5$

C) $-3 < x < 5$ D) $-3 < x \le 5$

E) $-3 \le x \le 5$

11. $\left.\begin{array}{l} 5-7x > 5 \\ 3-5x < -7 \end{array}\right\} \Rightarrow$ **ÇK(SS) = ?**

A) $-1 < x \le 2$ B) $-1 \le x < 2$

C) $-1 < x < 2$ D) $-1 \le x \le 2$

E) Ø

12. $x \le 2x - 3 \le x + 3,$

$x \in Z \Rightarrow \sum x = ?$

A) 11 B) 13 C) 14 D) 15 E) 18

13. $(4x - 3y) \in Z,$

$2 \le x < 9$ ve(and) $-3 < y \le 4$

$\Rightarrow$ **min(4x – 3y) = ?**

A) –4 B) –3 C) –2 D) 0 E) 1

14. $\frac{1}{10}\cdot(2x+1) < \frac{1}{2} - \frac{x+8}{5} \quad \Rightarrow$ **ÇK(SS) = ?**

A) $(-3, \infty)$ B) $(3, \infty)$ C) $(-\infty, -3)$

D) $(-\infty, 5)$ E) $(5, \infty)$

15. $-\frac{4}{1-x} > 0 \quad \Rightarrow$ **ÇK(SS) = ?**

A) $(-\infty, 0)$ B) $(0, 1)$ C) $(-\infty, -1)$

D) $(-1, 0)$ E) $(1, \infty)$

16. $\frac{-3x+6}{x^2+1} < 0 \quad \Rightarrow$ **ÇK(SS) = ?**

A) $(-1, 0)$ B) $(2, \infty)$ C) $(-\infty, 2)$

D) $(0, 1)$ E) $(-1, 1)$

Yanıtlar / Answers

1. E	4. C	7. E	10. D	13. A	16. B
2. B	5. C	8. B	11. E	14. C	
3. B	6. B	9. B	12. E	15. E	

1. $3x - 11 \leq 2x - 5$

$x \leq 6$

$x \in N^{+} \Rightarrow \sum x = 1 + 2 + 3 + 4 + 5 + 6 = 21$

Yanıt / Answer E

2. $3 < 2x - 7 \leq 5$

$10 < 2x \leq 12$

$5 < x \leq 6$

$x \in Z \Rightarrow x = 6$

Yanıt / Answer B

3. $2x + 5 > x + 5$

$x > 0$

$x \in N \Rightarrow \min(x) = 1$

Yanıt / Answer B

4. $3(x - 4) - 4(3 - x) \leq 25$

$3x - 12 - 12 + 4x \leq 25$

$7x \leq 49$

$x \leq 7$

$\max(x) = 7$

Yanıt / Answer C

5. $4x - 6 < 3x + 8 < 5x + 2$

$4x - 6 < 3x + 8$ ve (and) $3x + 8 < 5x + 2$

$x < 14$ $6 < 2x$

$3 < x$

$3 < x < 14$

$\Rightarrow \sum x = 4 + 5 + \ldots + 13 = 85$

Yanıt / Answer C

6. $-15 - 3x \geq 0$

$-15 \geq 3x$

$-5 \geq x$

$\Rightarrow$ ÇK(SS) $= (-\infty, -5]$

Yanıt / Answer B

7. $\frac{3-2x}{5} \leq -11$

$3 - 2x \leq -55$

$58 \leq 2x$

$29 \leq x$

$\Rightarrow$ ÇK(SS) $= [29, \infty)$

Yanıt / Answer E

8. $-2 < \frac{3x-5}{4} \leq 3$

$-8 < 3x - 5 \leq 12$

$-3 < 3x \leq 17$

$-1 < x \leq \frac{17}{3}$

$\Rightarrow$ ÇK(SS) $= \left(-1, \frac{17}{3}\right]$

Yanıt / Answer B

9. $-2 \le \dfrac{7-3x}{4} \le 4$

$-8 \le 7-3x \le 16$

$-15 \le -3x \le 9$

$5 \ge x \ge -3$

$\Rightarrow \sum x = (-3) + (-2) + \ldots + 2 + 3 + 4 + 5 = 9$

Yanıt / Answer B

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10. $3x - 12 \le 3$ $\qquad$ $2x + 7 > 1$

$3x \le 15$ $\qquad$ $2x > -6$

$x \le 5$ $\qquad$ $x > -3$

$\Rightarrow -3 < x \le 5$

Yanıt / Answer D

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11. $5 - 7x > 5$ $\qquad$ $3 - 5x < -7$

$7x < 0$ $\qquad$ $10 < 5x$

$x < 0$ $\qquad$ $2 < x$

$\Rightarrow$ ÇK(SS) $= \varnothing$

Yanıt / Answer E

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12. $x \le 2x - 3 \le x + 3$

$x \le 2x - 3$ $\qquad$ $2x - 3 \le x + 3$

$3 \le x$ $\qquad$ $x \le 6$

$3 \le x \le 6$

$\Rightarrow \sum x = 3 + 4 + 5 + 6 = 18$

Yanıt / Answer E

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13. $2 \le x < 9 \quad \Rightarrow \quad 8 \le 4x < 36$

$-3 < y \le 4 \quad \Rightarrow \quad -12 \le -3y < 9$

$$\begin{array}{l} + \\ \hline -4 \le 4x - 3y < 45 \end{array}$$

$\Rightarrow \min(4x - 3y) = -4$

Yanıt / Answer A

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14. $\dfrac{1}{10}(2x+1) < \underset{(5)}{\dfrac{1}{2}} - \underset{(2)}{\dfrac{x+8}{5}}$

$\dfrac{1}{10}(2x+1) < \dfrac{5-2x-16}{10}$

$2x+1 < -2x-11$

$4x < -12$

$x < -3$

$\Rightarrow$ ÇK(SS) $= (-\infty, -3)$

Yanıt / Answer C

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15. $-\dfrac{4}{1-x} > 0 \Rightarrow \dfrac{4}{1-x} < 0$

$1-x < 0$

$1 < x$

$\Rightarrow$ ÇK(SS) $= (1, \infty)$

Yanıt / Answer E

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16. $\forall x \in \mathbb{R},\ x^2 + 1 > 0 \Rightarrow -3x + 6 < 0$

$6 < 3x$

$2 < x$

$\Rightarrow$ ÇK(SS) $= (2, \infty)$

Yanıt / Answer B

1. $x - 5 \le 2x + 3 \le x + 4 \Rightarrow$ **ÇK(SS) = ?**

A) $-8 \le x \le 1$
B) $-7 \le x \le 0$
C) $-2 \le x \le 1$
D) $-8 \le x \le 7$
E) $-2 \le x \le 7$

2. $\dfrac{3x-6}{2x^2+4} > 0 \Rightarrow$ **ÇK(SS) = ?**

A) $x < 2$
B) $x > 2$
C) $0 < x < 2$
D) $R - \{2\}$
E) $x > -2$

3. $x \in Z$

$$\left.\begin{array}{l} 2x - 2 < 6 \\ x + 3 > 0 \end{array}\right\} \Rightarrow \sum x = ?$$

A) 1
B) 2
C) 3
D) 4
E) 6

4. $(3x - y) \in Z$,

$-2 \le x \le 3, \ 2 \le y \le 4$

$\Rightarrow$ **max(3x − y) = ?**

A) 4
B) 5
C) 6
D) 7
E) 8

5. $\dfrac{1}{7} < \dfrac{1}{x+3} \le \dfrac{1}{4}$

$x \in Z \Rightarrow \sum x = ?$

A) 6
B) 7
C) 8
D) 9
E) 10

6. $x \in Z$,

$2x - 6 \le 3x - 4 \le x + 6 \Rightarrow \sum x = ?$

A) −7
B) −5
C) 5
D) 7
E) 12

7. $x < y < 0, \quad A = \dfrac{3x+y}{x} \Rightarrow ? < A < ?$

A) $1 < A < 2$
B) $2 < A < 3$
C) $3 < A < 4$
D) $0 < A < 4$
E) $2 < A < 4$

8. $x, y \in Z, \ 2 \le x \le 8, \ 1 < y \le 7$

$\Rightarrow \max\left(\dfrac{3x-y}{y-1}\right) = ?$

A) 18
B) 19
C) 20
D) 22
E) 24

9. $\left.\begin{array}{l} -3x+5<17 \\ 4x-3\le 2x+5 \end{array}\right\} \Rightarrow$ **ÇK(SS) = ?**

A) [−4, 4] B) [−4, 4) C) (−4, 4]

D) (−4, 4) E) (−4, 5)

10. $x, y \in Z$

$\left.\begin{array}{l} -4<x\le 4 \\ -7<y\le 4 \end{array}\right\} \Rightarrow \mathbf{min(x^3-y^2)+max(x^3-y^2)=?}$

A) −7 B) −2 C) 0 D) 1 E) 7

11. $x, y \in Z$,

$-4 \le x \le 3,\ -2 \le y < 5 \Rightarrow$ **$\max(2x^2 - y) = ?$**

A) 16 B) 20 C) 24 D) 32 E) 34

12. $x, y \in Z$,

$-5 \le x \le 3,\ -2 \le y \le 1 \Rightarrow$ **$\min(2x^2 - 3y^3) = ?$**

A) −13 B) −7 C) −3 D) 1 E) 5

13. $-y > x - y,\ x > x + y$ ise, **aşağıdakilerden hangisi doğrudur?**

If $-y > x - y,\ x > x + y$, which of the following is true?

A) $\frac{x}{y} < 0$ B) $x \cdot y < 0$ C) $0 < x < y$

D) $x + y > 0$ E) $x + y < 0$

14. $x, y, z \in R$,

$x^6 \cdot y^3 > 0,\ x^4 \cdot z^5 < 0,\ 3x = 4z \Rightarrow$ **? < ? < ?**

A) $x < y < z$ B) $z < y < x$ C) $y < z < x$

D) $x < z < y$ E) $y < x < z$

15. $3 < x < 7,\ -5 < y < 4$

$(x - 3y) \in Z \Rightarrow$ **$\max(x - 3y) = ?$**

A) 20 B) 21 C) 22 D) 23 E) 24

16. $-1 \le x < 6,\ 3x + y = 14$,

$y \in Z \Rightarrow$ **$\sum y = ?$**

A) 147 B) 150 C) 157 D) 160 E) 163

Yanıtlar / Answers

1. A	4. D	7. C	10. D	13. E	16. A
2. B	5. A	8. D	11. E	14. D	
3. C	6. E	9. C	12. C	15. B	

1. $x - 5 \le 2x + 3 \le x + 4$

$x - 5 \le 2x + 3 \qquad 2x + 3 \le x + 4$

$-8 \le x \qquad x \le 1$

$\Rightarrow$ ÇK(SS) $= -8 \le x \le 1$

Yanıt / Answer A

2. $\forall x \in R, \quad 2x^2 + 4 > 0 \Rightarrow 3x - 6 > 0$

$3x > 6$

$x > 2$

Yanıt / Answer B

3. $2x - 2 < 6 \qquad x + 3 > 0$

$2x < 8 \qquad x > -3$

$x < 4$

$\Rightarrow \sum x = (-2) + (-1) + 0 + 1 + 2 + 3 = 3$

Yanıt / Answer C

4. $-2 \le x \le 3 \Rightarrow -6 \le 3x \le 9$

$2 \le y \le 4 \Rightarrow -4 \le -y \le -2$

$$\begin{array}{r} -6 \le 3x \le 9 \\ + \quad -4 \le -y \le -2 \\ \hline -10 \le 3x - y \le 7 \end{array}$$

$\Rightarrow \max(3x - 7) = 7$

Yanıt / Answer D

5. $\frac{1}{7} < \frac{1}{x+3} \le \frac{1}{4}$

$\Rightarrow 4 \le x + 3 < 7$

$1 \le x < 4$

$x \in Z \Rightarrow \sum x = 1 + 2 + 3 = 6$

Yanıt / Answer A

6. $2x - 6 \le 3x - 4 \le x + 6$

$2x - 6 \le 3x - 4 \qquad 3x - 4 \le x + 6$

$-2 \le x \qquad 2x \le 10$

$x \le 5$

$x \in Z \Rightarrow \sum x = (-2) + (-1) + 2 + \ldots + 5 = 12$

Yanıt / Answer E

7. $A = \frac{3x+y}{x} = \frac{3x}{x} + \frac{y}{x} = 3 + \frac{y}{x}$

$x < y < 0 \Rightarrow 0 < \frac{y}{x} < 1$

$0 + 3 < \frac{y}{x} + 3 < 1 + 3 \Rightarrow 3 < A < 4$

Yanıt / Answer C

8. $x, y \in Z \Rightarrow$

$2 \le x \le 8 \Rightarrow \max(x) = 8$

$1 < y \le 7 \Rightarrow \min(y) = 2$

$\Rightarrow \max\left(\frac{3x - y}{y - 1}\right) = \frac{3 \cdot 8 - 2}{2 - 1} = 22$

Yanıt / Answer D

9. $-3x + 5 < 17 \qquad\qquad 4x - 3 \leq 2x + 5$

$-12 < 3x \qquad\qquad 2x \leq 8$

$-4 < x \qquad\qquad x \leq 4$

$\Rightarrow -4 < x \leq 4$

$\Rightarrow$ ÇK(SS) $= (-4, 4]$

Yanıt / Answer C

10. $-4 < x \leq 4 \Rightarrow \min(x) = -3, \max(x) = 4$

$-7 < y \leq 4 \Rightarrow \min(y) = -6, \max(y) = 4$

$\min(x^3 - y^2) + \max(x^3 - y^2)$

$= [(-3)^3 - (-6)^2] + [4^3 - 0^2]$

$= -27 - 36 + 64 = 1$

Yanıt / Answer D

11. $-4 \leq x \leq 3$ ve (and) $x \in Z \Rightarrow \max(x^2) = 16$

$-2 \leq y < 5$ ve (and) $y \in Z \Rightarrow \min(y) = -2$

$\max(2x^2 - y) = 2 \cdot 16 - (-2) = 34$

Yanıt / Answer E

12. $-5 \leq x \leq 3$ ve (and) $x \in Z \Rightarrow \min(x^2) = 0$

$-2 \leq y \leq 1$ ve (and) $y \in Z \Rightarrow \max(y^3) = 1$

$\min(2x^2 - 3y^3) = 0 - 3 \cdot 1 = -3$

Yanıt / Answer C

13.
$$\begin{array}{lcl} -y > x - y & \Rightarrow & \ 0 > x \\ x > x + y & \Rightarrow & +\ 0 > y \\ \hline & & \ 0 > x + y \end{array}$$

Yanıt / Answer E

14. $\forall x \in R, \qquad x^6 > 0 \Rightarrow y^3 > 0$

$y > 0$

$\forall x \in R, \qquad x^4 > 0 \Rightarrow z^5 < 0$

$z < 0$

$3x = 4z \Rightarrow x = 4k,\ z = 3k \quad (k \in R)$

$\Rightarrow x < z$

$\Rightarrow x < z < 0 < y$

$\Rightarrow x < z < y$

Yanıt / Answer D

15.
$$\begin{array}{lcl} -5 < y < 4 & \Rightarrow & \ -12 < -3y < 15 \\ 3 < x < 7 & \Rightarrow & +\ \quad 3 < x < 7 \\ \hline & & \ -9 < x - 3y < 22 \end{array}$$

$\max(x - 3y) = 21$

Yanıt / Answer B

16. $3x + y = 14 \Rightarrow x = \dfrac{14 - y}{3}$

$-1 \leq x \leq 6 \Rightarrow -1 \leq \dfrac{14 - y}{3} < 6$

$-3 \leq 14 - y < 18$

$-17 \leq -y < 4$

$-4 < y \leq 17$

$\sum y = (-3) + \ldots + 3 + 4 + \ldots + 17 = \dfrac{17 \cdot 18}{2} - \dfrac{3 \cdot 4}{2} = 147$

Yanıt / Answer A

MUTLAK DEĞER
ABSOLUTE VALUE

BÖLÜM
CHAPTER
3

Mutlak Değer / Absolute Value

Test 1

1. $1 < x < 3 \Rightarrow |x - 3| + |x + 2| = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

2. $1 < x < 2 \Rightarrow |x - 1| + |x - 2| = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

3. $x < y < z \Rightarrow |x - y| - |y - z| = ?$

A) $x - y$ B) $-x - y$ C) $2y$
D) $2y - x - z$ E) $x + y$

4. $\min|2x - 4| \Rightarrow x = ?$

A) –4 B) –2 C) 0 D) 2 E) 4

5. $A = |x - 2| + |x - 5| \Rightarrow \min(A) = ?$

A) 2 B) 3 C) 5 D) 6 E) 7

6. $A = |x - 3| + |x + 2| + |x - 1| \Rightarrow \min(A) = ?$

A) 2 B) 3 C) 5 D) 6 E) 7

7. $a < b < c \Rightarrow |a - b| + |a - c| - |b - c| = ?$

A) $-2a - 2b$ B) $2b - 2a$ C) $2b - 2c$
D) $2a - 2c$ E) $2b$

8. $a < b < 0 \Rightarrow |a - b| + |a + b| + |ab| = ?$

A) $ab - 2a$ B) $ab - 2b$ C) $2b + ab$
D) $2a - ab$ E) $2b - ab$

9. $0 < x < 1 \Rightarrow |x - 1| + |2x - 4| + |2x + 1| = ?$

A) $2 - x$ B) $4 - x$ C) $6 - x$ D) $3 - 3x$ E) $x + 4$

10. $x < 0 \Rightarrow \dfrac{|x|+|-x|+|-2x|}{-|-x|} = ?$

A) -4 B) -2 C) 0 D) 2 E) 4

11. $|2x - y| + |4x - 3y + 6| = 0 \Rightarrow x - y = ?$

A) -6 B) -3 C) 0 D) 3 E) 9

12. $|x - y - 4| + |x + y - 8| = 0 \Rightarrow x \cdot y = ?$

A) -12 B) -8 C) -6 D) 8 E) 12

13. $|2x - 1| = 9 \Rightarrow$ **ÇK(SS) = ?**

A) $\{-4\}$ B) $\{5\}$ C) $\{0\}$ D) $\{-4, 4\}$ E) $\{-4,5\}$

14. $2|x - 3| + 3 = 11 \Rightarrow$ **ÇK(SS) = ?**

A) $\{-2, 5\}$ B) $\{-1, 9\}$ C) $\{-1, 7\}$ D) $\{-2, 7\}$ E) $\{1,7\}$

15. $|2x + 5| + 1 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\{-3\}$ B) $\{-2\}$ C) $\varnothing$ D) $\{2\}$ E) $\{3\}$

16. $a > 0,\ b < 0$

$$|a-b|+|3a|-\sqrt{4b^2} = ?$$

A) $4a + 3b$ B) $4a - 3b$ C) $4a + b$ D) $4a - b$ E) $2a - b$

[YTÜ. YÖS 2011]

Yanıtlar / Answers

1. E	4. D	7. B	10. A	13. E	16. C
2. A	5. B	8. A	11. B	14. C	
3. D	6. C	9. C	12. E	15. C	

1. $1 < x < 3 \Rightarrow x - 3 < 0 \Rightarrow |x - 3| = 3 - x$

$1 < x < 3 \Rightarrow x + 2 > 0 \Rightarrow |x + 2| = 2 + x$

$\Rightarrow |x - 3| + |x + 2| = 3 - x + 2 + x = 5$

Yanıt / Answer E

2. $1 < x \Rightarrow 0 < x - 1 \Rightarrow |x - 1| = x - 1$

$x < 2 \Rightarrow x - 2 < 0 \Rightarrow |x - 2| = 2 - x$

$\Rightarrow |x - 1| + |x - 2| = x - 1 + 2 - x = 1$

Yanıt / Answer A

3. $x < y \Rightarrow x - y < 0 \Rightarrow |x - y| = y - x$

$y < z \Rightarrow y - z < 0 \Rightarrow |y - z| = z - y$

$$\begin{aligned}\Rightarrow |x - y| - |y - z| &= y - x - (z - y)\\ &= y - x - z + y\\ &= 2y - x - z\end{aligned}$$

Yanıt / Answer D

4. $\min|2x - 4| = 0$

$2x - 4 = 0$

$x = 2$

Yanıt / Answer D

5. $\min(A) \Rightarrow |x - 2| = 0$ veya (or) $|x - 5| = 0$

$x = 2$ $\qquad$ $x = 5$

$\min(A) = |2 - 2| + |2 - 5|$ $\qquad$ $\min(A) = |5 - 2| + |5 - 5|$

$= 0 + 3 = 3$ $\qquad$ $= 3 + 0 = 3$

$\Rightarrow \min(A) = 3$

Yanıt / Answer B

6. $\min(A) \Rightarrow |x - 3| = 0 \Rightarrow x = 3$

$\min(A) = |3 - 3| + |3 + 2| + |3 - 1|$

$= 0 + 5 + 2 = 7$

$\min(A) \Rightarrow |x + 2| = 0 \Rightarrow x = -2$

$\min(A) = |-2 - 3| + |-2 + 2| + |-2 - 1|$

$= 5 + 3 = 8$

$\min(A) \Rightarrow |x - 1| = 0 \Rightarrow x = 1$

$\min(A) = |4 - 3| + |1 + 2| + |1 - 1| = 5$

$\Rightarrow \min(A) = 5$

Yanıt / Answer C

7. $a < b \Rightarrow a - b < 0$

$a < c \Rightarrow a - c < 0$

$b < c \Rightarrow b - c < 0$

$$\begin{aligned}\Rightarrow |a - b| + |a - c| - |b - c| &= b - a + c - a - (c - b)\\ &= b + c - 2a - c + b\\ &= 2b - 2a\end{aligned}$$

Yanıt / Answer B

8. $a < b \Rightarrow a - b < 0$

$a < b < 0 \Rightarrow a + b < 0$, $a \cdot b > 0$

$$\begin{aligned}\Rightarrow |a - b| + |a + b| + |a \cdot b| &= b - a - a - b + a \cdot b\\ &= ab - 2a\end{aligned}$$

Yanıt / Answer A

9. $0 < x < 1 \Rightarrow x - 1 < 0,\ 2x - 4 < 0,\ 2x + 1 > 0$

$\Rightarrow |x - 1| + |2x - 4| + |2x + 1| = 1 - x + 4 - 2x + 2x + 1$

$= 6 - x$

Yanıt / Answer C

---

10. $x < 0 \Rightarrow -x > 0 \Rightarrow$

$$\frac{|x|+|-x|+|-2x|}{-|-x|} = \frac{-x+(-x)+(-2x)}{-(-x)}$$

$$= \frac{-4x}{x} = -4$$

Yanıt / Answer A

---

11. $|2x - y| + |4x - 3y + 6| = 0$

$2x - y = 0$ ve (and) $4x - 3y + 6 = 0$

$y = 2x$

$4x - 3\cdot 2x + 6 = 0$

$2x = 6$

$x = 3$

$y = 2\cdot 3 = 6$

$\Rightarrow x - y = 3 - 6 = -3$

Yanıt / Answer B

---

12. $|x - y - 4| + |x + y - 8| = 0$

$x - y - 4 = 0$ ve (and) $x + y - 8 = 0$

$$\begin{array}{r} x - y = 4 \\ + \quad x + y = 8 \\ \hline 2x = 12 \end{array}$$

$x = 6\ ,\quad y = 2$

$\Rightarrow x \cdot y = 6 \cdot 2 = 12$

Yanıt / Answer E

---

13. $|2x - 1| = 9 \Leftrightarrow 2x - 1 = 9$ veya (or) $2x - 1 = -9$

$2x = 10 \qquad 2x = -8$

$x = 5 \qquad x = -4$

$\Rightarrow$ ÇK(SS) $= \{-4, 5\}$

Yanıt / Answer E

---

14. $2\cdot|x - 3| + 3 = 11$

$2\cdot|x - 3| = 8$

$|x - 3| = 4$

$x - 3 = 4$ veya (or) $x - 3 = -4$

$x = 7 \qquad x = -1$

$\Rightarrow$ ÇK(SS) $= \{-1, 7\}$

Yanıt / Answer C

---

15. $|2x + 5| + 1 = 0$

$|2x + 5| = -1$

$\Rightarrow$ ÇK(SS) $= \varnothing$

Yanıt / Answer C

---

16. $b < 0 \Rightarrow -b > 0 \Rightarrow a - b > 0 \Rightarrow |a - b| = a - b$

$a > 0 \Rightarrow 3a > 0 \Rightarrow |3a| = 3a$

$\sqrt{4b^2} = \sqrt{(2b)^2} = |2b| = -2b$

$|a - b| + |3a| - \sqrt{4b^2} = a - b + 3a + 2b$

$= 4a + b$

Yanıt / Answer C

1. $|3x-5| = A$,
min(A) ve (and) $12x + 5y = 35 \Rightarrow$ **y = ?**

A) 2 B) 3 C) 4 D) 5 E) 7

2. $-3 < x < 5 \Rightarrow$ **$|x+3| + |x-5| = ?$**

A) –2 B) 2 C) 3 D) 5 E) 8

3. $x^4 \cdot y^3 < 0$, $x^5 \cdot z^2 < 0$, $y^2z^5 > 0$,
$\Rightarrow$ **$|x-z| + |z-y| - |x+y| = ?$**

A) 2x B) 2y C) 2z D) –1 E) 0

4. $x < 0 < y \Rightarrow x+y+\sqrt{x^2-2yx+y^2} = ?$

A) 0 B) x C) 2x D) y E) 2y

5. $x < |x| \Rightarrow$ **$|3x| + |-2x| = ?$**

A) –5 B) –1 C) –x D) –5x E) 5x

6. $|x+3| + |x-5| = A \Rightarrow$ **min(A) = ?**

A) 0 B) 2 C) 3 D) 5 E) 8

7. $|2x-3| + |3x-7| = A \Rightarrow$ **min(A) = ?**

A) $\frac{5}{3}$ B) $\frac{5}{2}$ C) 3 D) 7 E) 10

8. $\frac{48}{|x-4|+|x+2|} = A \Rightarrow$ **max(A) = ?**

A) 6 B) 8 C) 12 D) 16 E) 24

9. $-3 < x < 3 \Rightarrow \sqrt{x^2-6x+9} - \sqrt{x^2+6x+9} = ?$

A) $-2x + 6$ B) $-2x$ C) $2x + 6$

D) -6 E) 6

10. $|x - a + 3| + |y + b - 13| = 0,$
$x + y = 5 \Rightarrow$ **a − b = ?**

A) -10 B) -7 C) -5 D) 5 E) 7

11. $|x - 5| = 2 \Rightarrow$ **ÇK(SS) = ?**

A) {5} B) {3} C) {7}

D) {3, 7} E) {−3, 7}

12. $|x - 2| + |2 - x| = 6 \Rightarrow$ **ÇK(SS) = ?**

A) $\varnothing$ B) R C) {−1}

D) {5} E) {−1, 5}

13. $|1 - 3x| - 14 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{-\frac{11}{3}, 5\right\}$ B) $\left\{-\frac{13}{3}, 5\right\}$ C) $\{-5, 5\}$

D) $\{5\}$ E) $\varnothing$

14. $4x - |3x| = 7 \Rightarrow$ **ÇK(SS) = ?**

A) {1} B) {7} C) {1, 7}

D) $\varnothing$ E) R

15. $||x - 2| - 3| = 5 \Rightarrow$ **ÇK(SS) = ?**

A) {−6, 10} B) {−10, 6} C) {−6, 4, 0, 10}

D) {0, 4} E) {0, 10}

16. $|x - y + 1| + \sqrt{9x^2 - 6xy + y^2} = 0 \Rightarrow$ **$x + y = ?$**

A) $\frac{1}{2}$ B) $\frac{3}{2}$ C) 1

D) 2 E) 3

[YÖS 2003]

Yanıtlar / Answers

1. B	4. E	7. A	10. C	13. B	16. D
2. E	5. D	8. B	11. D	14. B	
3. C	6. E	9. B	12. E	15. A	

1. $\min(A) \Rightarrow |3x-5| = 0$

$$3x-5=0$$

$$x=\frac{5}{3}$$

$$12\cdot x+5y=35$$

$$12\cdot\frac{5}{3}+5y=35$$

$$y=3$$

Yanıt / Answer B

---

2. $-3<x \Rightarrow 0<x+3$

$x<5 \Rightarrow x-5<0$

$$\begin{aligned}|x+3|+|x-5| &= x+3+(5-x)\\ &= x+3+5-x\\ &= 8\end{aligned}$$

Yanıt / Answer E

---

3. $x^4\cdot y^3<0 \Rightarrow y<0$

$x^5\cdot z^2<0 \Rightarrow x<0$

$y^2\cdot z^5>0 \Rightarrow z>0$

$x<0,\ z>0 \Rightarrow x-z<0$

$z>0,\ y<0 \Rightarrow z-y>0$

$x<0,\ y<0 \Rightarrow x+y<0$

$$\begin{aligned}|x-z|+|z-y|-|x+y| &= -x+z+z-y-(-x-y)\\ &= 2z-x-y+x+y=2z\end{aligned}$$

Yanıt / Answer C

---

4. $x<0<y \Rightarrow x-y<0$

$$\begin{aligned}x+y+\sqrt{x^2-2xy+y^2} &= x+y+\sqrt{(x-y)^2}\\ &= x+y+|x-y|\\ &= x+y-x+y\\ &= 2y\end{aligned}$$

Yanıt / Answer E

---

5. $x<|x| \Leftrightarrow x<0$

$$\begin{aligned}|3x|+|-2x| &= 3\cdot|x|+|-2|\cdot|x|\\ &= 3\cdot|x|+2\cdot|x|\\ &= 3\cdot(-x)+2\cdot(-x)\\ &= -5x\end{aligned}$$

Yanıt / Answer D

---

6. $\min(A) \Rightarrow |x+3|=0$ veya(or) $|x-5|=0$

$x=-3$ $\quad$ $x=5$

$\min(A)=|-3+3|+|-3-5|$ $\quad$ $\min(A)=|5+3|+|5-5|$

$=8$ $\quad$ $=8$

Yanıt / Answer E

---

7. $\min(A) \Rightarrow |3x-7|=0 \Rightarrow x=\frac{7}{3}$

$$\min(A)=\left|2\cdot\frac{7}{3}-3\right|+\left|3\cdot\frac{7}{3}-7\right|=\frac{5}{3}$$

$\min(A) \Rightarrow |2x-3|=0 \Rightarrow x=\frac{3}{2}$

$$\min(A)=\left|2\cdot\frac{3}{2}-3\right|+\left|3\cdot\frac{3}{2}-7\right|=0+\frac{5}{2}=\frac{5}{2}$$

Yanıt / Answer A

---

8. $|x+2|=0$ veya(or) $|x-4|=0$

$x=-2$ $\quad$ $x=4$

$$\max(A)=\frac{48}{|-2-4|+|-2+2|}=\frac{48}{6}=8$$

$$\max(A)=\frac{48}{|4-4|+|4+2|}=8$$

Yanıt / Answer B

9. $-3 < x \Rightarrow 0 < x + 3$

$x < 3 \Rightarrow x - 3 < 0$

$$\sqrt{x^2-6x+9}-\sqrt{x^2+6x+9}=\sqrt{(x-3)^2}-\sqrt{(x+3)^2}$$
$$=|x-3|-|x+3|$$
$$=3-x-x-3$$
$$=-2x$$

Yanıt / Answer B

---

10. $|x-a+3|+|y+b-13|=0 \Leftrightarrow$

$|x-a+3|=0$ ve(and) $|y+b-13|=0$

$x-a+3=0$ $\quad$ $y+b-13=0$

$x-a=-3$ $\quad$ $y+b=13$

$$\begin{array}{r} x-a=-3 \\ +\;\; y+b=13 \\ \hline \underbrace{x+y}_{5}+b-a=10 \end{array}$$

$b-a=5 \Rightarrow a-b=-5$

Yanıt / Answer C

---

11. $|x-5|=2 \Leftrightarrow x-5=2$ veya (or) $x-5=-2$

$x=7$ $\quad$ $x=3$

$\Rightarrow$ ÇK(SS) $=\{3, 7\}$

Yanıt / Answer D

---

12. $|x-2|=|2-x|$

$\Rightarrow |x-2|+|x-2|=6$

$2\cdot|x-2|=6$

$|x-2|=3$

$x-2=3$ veya(or) $x-2=-3$

$x=5$ $\quad$ $x=-1$

$\Rightarrow$ ÇK(SS) $=\{-1, 5\}$

Yanıt / Answer E

---

13. $|1-3x|-14=0$

$|1-3x|=14$

$1-3x=14$ veya(or) $1-3x=-14$

$-13=3x$ $\quad$ $15=3x$

$x=-\dfrac{13}{3}$ $\quad$ $x=5$

$$\Rightarrow \text{ÇK(SS)}=\left\{-\frac{13}{3}, 5\right\}$$

Yanıt / Answer B

---

14. **I.** $x>0 \Rightarrow 4x-3x=7$

$x=7$

II. $x<0 \Rightarrow 4x+3x=7$

$7x=7$

$x=1$

$x<0 \Rightarrow x\neq 1$

$\Rightarrow$ ÇK(SS) $=\{7\}$

Yanıt / Answer B

---

15. $||x-2|-3|=5 \Rightarrow$

$|x-2|-3=5$ veya(or) $|x-2|-3=-5$

$|x-2|=8$ $\quad$ $|x-2|=-2$

ÇK(SS) $=\varnothing$

$x-2=8$ veya(or) $x-2=-8$

$x=10$ $\quad$ $x=-6$

$\Rightarrow$ ÇK(SS) $=\{-6, 10\}$

Yanıt / Answer A

---

16. $|x-y+1|+\sqrt{(3x-y)^2}=0$

$|x-y+1|+|3x-y|=0$

$3x-y=0 \;,\; x-y+1=0$

$y=3x \;,\; x-3x+1=0$

$-2x+1=0 \Rightarrow x=\dfrac{1}{2}$

$y=3\cdot\left(\dfrac{1}{2}\right)=\dfrac{3}{2}$

$\Rightarrow x+y=\dfrac{1}{2}+\dfrac{3}{2}=2$

Yanıt / Answer D

1. $x < y < 0 < z \Rightarrow \dfrac{|x+y|-|z-x|}{|-z|-|-y|} = ?$

A) –1 B) x + y C) y – z D) x + z E) 1

2. $x - y = 3$

$a\,|x-y| + |y-x| = 21 \Rightarrow a = ?$

A) 4 B) 5 C) 6 D) 7 E) 8

3. $|2x-3| > 5,\ x \in \mathbb{Z} \Rightarrow \sum x = ?$

A) –17 B) –13 C) –11 D) –9 E) –7

4. $x = -2 \Rightarrow |3x+2| - |3-2x| - 4x + 1 = ?$

A) –10 B) –6 C) 0 D) 6 E) 10

5. $x < 0 \Rightarrow |x| - 3|x-1| + |2-x| = ?$

A) x + 1 B) x – 1 C) x D) x + 2 E) x – 2

6. $|x-1| = |x-2| \Rightarrow x = ?$

A) 1 B) $\frac{1}{3}$ C) 2 D) $\frac{5}{2}$ E) $\frac{3}{2}$

7. $|2-x| + |4x-8| = 15 \Rightarrow$ **ÇK(SS) = ?**

A) {–1, 3} B) {–1, 4} C) {–1, 5} D) {1, 3} E) {1, 5}

8. $\left|\frac{2}{x} - 1\right| = 3 \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{-1, \frac{1}{2}\right\}$ B) $\left\{-1, \frac{1}{4}\right\}$ C) $\left\{1, \frac{1}{2}\right\}$ D) $\left\{1, \frac{1}{4}\right\}$ E) $\left\{-\frac{1}{2}, 1\right\}$

9. $|3x-3|-5x+13=0 \Rightarrow$ **ÇK(SS) = ?**

A) {2, 5} B) {–2, 5} C) {–5, 2}
D) {2} E) {5}

10. $|3x-2| \le 7,\ x \in Z \Rightarrow \sum x = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

11. $|x^2-x-6| = |x-3| \Rightarrow$ **ÇK(SS) = ?**

A) {–2, 2} B) {–3, 3} C) {–3, –1}
D) {–3, –1, 3} E) {–2, 3}

12. $2 < |x-1| < 7,\ x \in Z \Rightarrow \sum x = ?$

A) 8 B) 9 C) 10 D) 12 E) 15

13. $|x-2|+|x+3| = 5 \Rightarrow$ **ÇK(SS) = ?**

A) {–3, 2} B) {–2, 3} C) R
D) Ø E) [–3, 2]

14. $|x-1|+|x+5| = 5 \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{-\frac{9}{2},\frac{1}{2}\right\}$ B) $\left[-\frac{9}{2},\frac{1}{2}\right]$ C) $\left\{-\frac{1}{2},\frac{9}{2}\right\}$
D) R E) ∅

15. $\left|\frac{1-x}{2}\right| = x+5 \Rightarrow$ **ÇK(SS) = ?**

A) {–11} B) {–3} C) {–11, –3}
D) {3} E) {11}

Yanıtlar / Answers

1. A	**4. D**	**7. C**	**10. D**	**13. E**
2. C	**5. B**	**8. A**	**11. D**	**14. E**
3. D	**6. E**	**9. E**	**12. A**	**15. B**

1. $x < y < 0 \Rightarrow x + y < 0$

$x < z \Rightarrow 0 < z - x$

$$\frac{|x+y|-|z-x|}{|-z|-|-y|}=\frac{-x-y-z+x}{z-(-y)}=\frac{-(y+z)}{z+y}=-1$$

Yanıt / Answer A

---

2. $|x - y| = |y - x|$

$\Rightarrow a|x - y| + |x - y| = 21$

$(a + 1)\cdot\underbrace{|x - y|}_{3} = 21$

$a + 1 = 7$

$a = 6$

Yanıt / Answer C

---

3. $|2x - 3| > 5 \Rightarrow 2x - 3 > 5$ veya(or) $2x - 3 < -5$

$2x > 8$ $\quad$ $2x < -2$

$x > 4$ $\quad$ $x < -1$

$\Rightarrow \sum x = \ldots + (-5) + (-4) + (-3) + (-2) + 5 + \ldots = -9$

Yanıt / Answer D

---

4. $x = -2 \Rightarrow |3\cdot(-2) + 2| - |3 - 2\cdot(-2)| - 4\cdot(-2) + 1$

$= |-4| - |7| + 9$

$= 4 - 7 + 9 = 6$

Yanıt / Answer D

---

5. $x < 0 \Rightarrow |x| = -x$

$|x| - 3|x - 1| + |2 - x| = -x - 3(1 - x) + (2 - x)$

$= -x - 3 + 3x + 2 - x$

$= x - 1$

Yanıt / Answer B

---

6. $|x - 1| = |x - 2|$

$x^2 - 2x + 1 = x^2 - 4x + 4$

$2x = 3$

$x = \frac{3}{2}$

Yanıt / Answer E

---

7. $|2 - x| + |4x - 8| = 15$

$|2 - x| + 4\cdot|x - 2| = 15$

$5\cdot|x - 2| = 15$

$|x - 2| = 3$

$x - 2 = 3$ veya(or) $x - 2 = -3$

$x = 5$ $\quad$ $x = -1$

ÇK(SS) = $\{-1, 5\}$

Yanıt / Answer C

---

8. $\left|\frac{2}{x}-1\right|=3 \Leftrightarrow \frac{2}{x}-1=3$ veya(or) $\frac{2}{x}-1=-3$

$\frac{2}{x}=4$ $\quad$ $\frac{2}{x}=-2$

$x=\frac{1}{2}$ $\quad$ $x=-1$

ÇK(SS)$=\left\{-1,\frac{1}{2}\right\}$

Yanıt / Answer A

9. $|3x-3| - 5x + 13 = 0$

$|3x-3| = 5x - 13$

$3x + 3 = 5x + 3$ $\qquad$ $3x - 3 = 13 - 5x$

$10 = 2x$ $\qquad$ $8x = 16$

$x = 5$ $\qquad$ $x = 2$

$5\cdot5 - 13 = 12 > 0$ $\qquad$ $5\cdot2 - 13 = -3 < 0$

ÇK(SS) = $\{5\}$

Yanıt / Answer E

---

10. $|3x-2| \le 7 \Rightarrow -7 \le 3x - 2 \le 7$

$-5 \le 3x \le 9$

$-\frac{5}{3} \le x \le 3$

$\Rightarrow \sum x = (-1) + 0 + 1 + 2 + 3 = 5$

Yanıt / Answer D

---

11. $|x^2 - x - 6| = |x-3|$

$|x-3|\cdot|x+2| = |x-3|$

$|x-3|\cdot(|x+2| - 1) = 0$

$|x-3| = 0$ veya(or) $|x+2| - 1 = 0$

$x - 3 = 0$ $\qquad$ $|x+2| = 1$

$x = 3$ $\qquad$ $x + 2 = 1$ veya(or) $x + 2 = -1$

$x = -1$ $\qquad$ $x = -3$

ÇK(SS) = $\{-3, -1, 3\}$

Yanıt / Answer D

---

12. $2 < |x-1| < 7$

$2 < x - 1 < 7$ $\qquad$ $-7 < x - 1 < -2$

$3 < x < 8$ $\qquad$ $-6 < x < -1$

$\Rightarrow \sum x = 4 + 5 + 6 + 7 - 5 - 4 - 3 - 2 = 8$

Yanıt / Answer A

---

13. $x - 2 = 0$, $x + 3 = 0$

$x = 2$ $\qquad$ $x = -3$

		−3		2	
x − 2	−		−	○	+
x + 3	−	○	+		+

$x \ge 2 \Rightarrow x - 2 + x + 3 = 5$

$2x + 1 = 5$

$2x = 4$

$x = 2$

$-3 \le x < 2 \Rightarrow 2 - x + x + 3 = 5$

$5 = 5 \quad (x \in [-3, 2))$

$x < -3 \Rightarrow 2 - x - x - 3 = 5$

$-2x - 1 = 5$

$-2x = 6$

$x = -3$

ÇK(SS) = $[-3, 2]$

Yanıt / Answer E

---

14. $|x-1| + |x+5| = 5$

$x - 1 = 0$, $x + 5 = 0$

$x = 1$ $\qquad$ $x = -5$

		−5		1	
x − 1	−		−	○	+
x + 5	−	○	+		+

$x \ge 1 \Rightarrow x - 1 + x + 5 = 5$

$2x + 4 = 5 \Rightarrow x = \frac{1}{2}$

$\frac{1}{2} < 1 \Rightarrow x \ne \frac{1}{2}$

$-5 \le x < 1 \Rightarrow 1 - x + x + 5 = 5$

$6 \ne 5 \quad (x \notin [-5, 1))$

$x < -5 \Rightarrow -x + 1 - x - 5 = 5$

$2x = -9 \Rightarrow x = -\frac{9}{2}$

$-\frac{9}{2} > -5 \Rightarrow x \ne -\frac{9}{2}$

ÇK(SS) = $\varnothing$

Yanıt / Answer E

---

15. $\left|\frac{1-x}{2}\right| = x + 5$

$|1-x| = 2x + 10$

$1 - x = 2x + 10$, $\qquad$ $1 - x = -2x - 10$

$3x = -9$ $\qquad$ $x = -11$

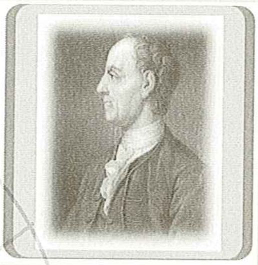
$x = -3$ $\qquad$ $2\cdot(-11) + 10 = -12 < 0$

$2\cdot(-3) + 10 = 4 > 0$

ÇK(SS) = $\{-3\}$

Yanıt / Answer B

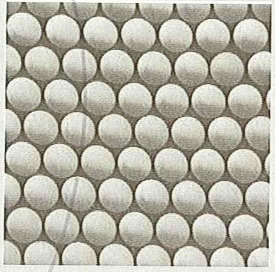
ÜNİTE 5
UNIT

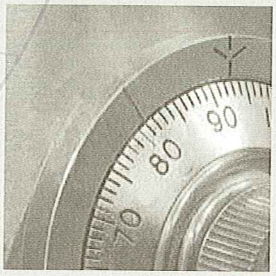


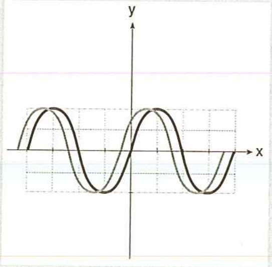
Leonhard Euler [1707 – 1783]

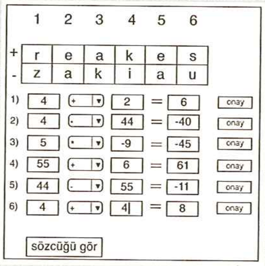
Leonhard Euler, matematik, fizik, analitik geometri, trigonometri ve sayı teorisi konusunda katkıları bulunan bir İsviçre matematikçisidir.

Leonhard Euler was a Swiss mathematician who made enormous contibutions to a wide range of mathematics and physics including analytic geometry, trigonometry, geometry, calculus and number theory







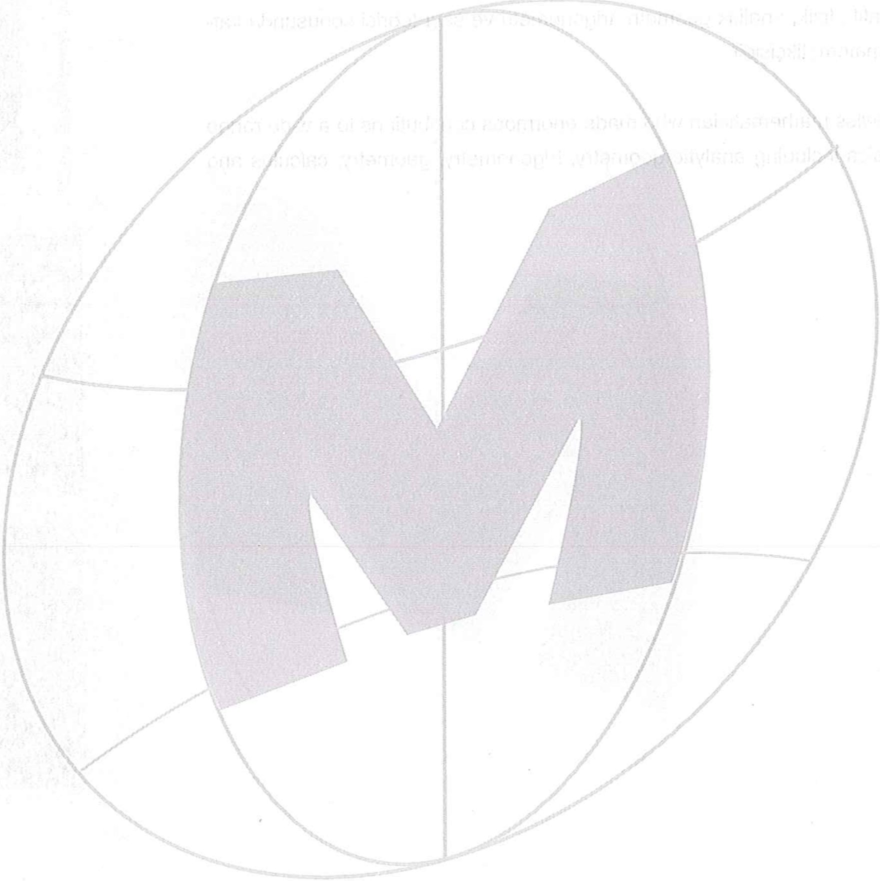


	1	2	3	4	5	6
+	r	e	a	k	e	s
-	z	a	k	i	a	u

1) 4 + 2 = 6
2) 4 - 44 = -40
3) 5 · -9 = -45
4) 55 + 6 = 61
5) 44 - 55 = -11
6) 4 + 4 = 8

✓ **KÜMELER** .... 167 – 178
✓ **FONKSİYONLAR** .... 179 – 194
✓ **İŞLEM ve MODÜLER ARİTMETİK** .... 195 – 202

✓ SETS .... 167 – 178
✓ FUNCTIONS .... 179 – 194
✓ OPERATION and MODULAR SYSTEM .... 195 – 202



Kümeler / Sets

Test 1

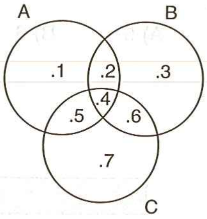
1. $\left.\begin{array}{l} A=\{2,3,4,5\} \\ B=\{3,4,5,6\} \\ C=\{4,5,6,7\} \end{array}\right\} \Rightarrow \mathbf{(A \cup B) \cap C = ?}$

A) {4} B) {4, 5} C) {4, 6}
D) {5, 6} E) {4, 5, 6}

2. $\left.\begin{array}{l} n(E)=25 \\ n(A' \cap B')=12 \end{array}\right\} \Rightarrow \mathbf{n(A \cup B) = ?}$

A) 10 B) 11 C) 12 D) 13 E) 14

3. $\mathbf{(A \cup B) \setminus C = ?}$



A) {2} B) {1, 2, 3} C) {4, 5, 6}
D) {7} E) {4}

4. $\left.\begin{array}{l} n(A \cup B)=13 \\ n(A \cap B)=6 \\ n(A \setminus B)=1 \end{array}\right\} \Rightarrow \mathbf{n(B \setminus A) = ?}$

A) 4 B) 5 C) 6 D) 7 E) 8

5. $\left.\begin{array}{l} n(A \cup B)=11 \\ n(A \cap B)=2 \\ n(B \setminus A)=5 \end{array}\right\} \Rightarrow \mathbf{n(A) = ?}$

A) 4 B) 5 C) 6 D) 7 E) 8

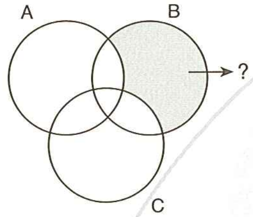
6. $\left.\begin{array}{l} A=\{1, 4, 9, 16, 25, 36, 49, 64, 81\} \\ B=\{x \mid x^2 \in A\} \end{array}\right\} \Rightarrow \mathbf{n(A \cap B) = ?}$

A) 2 B) 3 C) 4 D) 6 E) 9

7. $[(A \cap A') \cup A] \cup B = ?$

A) $\varnothing$ B) E C) A D) $A \cup B$ E) A'

8.



A) $A \cup C$ B) $B \setminus A$ C) $B \setminus C$ D) $(A \cup C) \setminus B$ E) $B \setminus (A \cup C)$

9. $(A \setminus B) \setminus B' = ?$

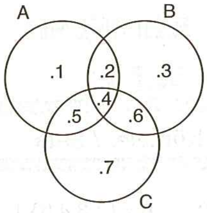
A) $\varnothing$ B) E C) $A \cup B$ D) B E) B'

10. $(A \cap B') \cap (A' \cup B) = ?$

A) E B) $\varnothing$ C) $A \cup B$ D) $A \cap B$ E) B

11. $A \cup B \cup C = E$.

$A \setminus (B' \cup C) = ?$



A) {1} B) {1, 2} C) {1, 2, 3} D) {2} E) {4, 5, 6}

12.

$$\left.\begin{array}{l} n(A \setminus B) = 2 \cdot n(B \setminus A) \\ n(A \cap B) = 3 \\ n(A) = 11 \end{array}\right\} \Rightarrow \mathbf{n(B \setminus A) = ?}$$

A) 4 B) 5 C) 6 D) 7 E) 8

13.

$$\left.\begin{array}{l} n(A) = 7 \\ n(A') = 4 \\ n(B') = 6 \end{array}\right\} \Rightarrow \mathbf{n(B) = ?}$$

A) 4 B) 5 C) 6 D) 7 E) 8

14.

$$\left.\begin{array}{l} n(A \cup B) = 9 \\ n(A \setminus B) = 2 \cdot n(B) \\ n(A \cap B) = 1 \end{array}\right\} \Rightarrow \mathbf{n(A) = ?}$$

A) 5 B) 6 C) 7 D) 8 E) 9

Yanıtlar / Answers

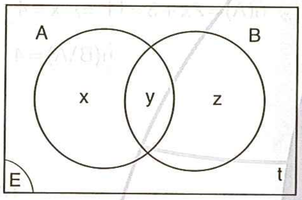
1. E	4. C	7. D	10. B	13. B
2. D	5. C	8. E	11. D	14. C
3. B	6. B	9. A	12. A	

1.

$$\left.\begin{array}{l} A=\{2,3,4,5\} \\ B=\{3,4,5,6\} \\ C=\{4,5,6,7\} \end{array}\right\} \Rightarrow \begin{array}{l} A\cup B=\{2,3,4,5,6\} \\ (A\cup B)\cap C=\{4,5,6\} \end{array}$$

Yanıt / Answer E

2.



$n(E) = x + y + z + t = 25$

$n(A' \cap B') = t = 12$

$n(A \cup B) = x + y + z = 25 - 12 = 13$

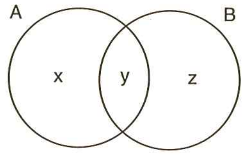
Yanıt / Answer D

3.

$$\left.\begin{array}{l} A=\{1,2,4,5\} \\ B=\{2,3,4,6\} \\ C=\{4,5,6,7\} \end{array}\right\} \Rightarrow \begin{array}{l} A\cup B=\{1,2,3,4,5,6\} \\ (A\cup B)\setminus C=\{1,2,3\} \end{array}$$

Yanıt / Answer B

4.



$n(A \cup B) = x + y + z = 13$

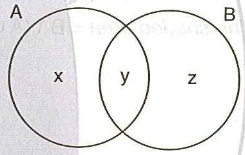
$n(A \cap B) = y = 6$

$n(A \setminus B) = x = 1$

$\Rightarrow n(B \setminus A) = z = 6$

Yanıt / Answer C

5.



$$\left.\begin{array}{l} n(A\cup B)=x+y+z=11 \\ n(A\cap B)=y=2 \\ n(B\setminus A)=z=5 \end{array}\right\} \Rightarrow n(A)=x+y=4+2=6$$

$x + y + z = 11$

$x + 2 + 5 = 11$

$x = 4$

Yanıt / Answer C

6. $A = \{1, 4, 9, 16, 25, 36, 49, 64, 81\}$

$B = \{x \mid x^2 \in A\}$

$1^2 = 1,\ 1 \in A$

$4^2 = 16,\ 16 \in A$

$9^2 = 81,\ 81 \in A$

$\Rightarrow A \cap B = \{1, 4, 9\} \Rightarrow n(A \cap B) = 3$

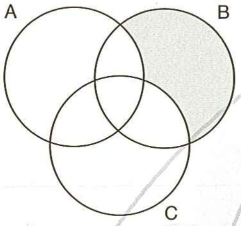
Yanıt / Answer B

7. $A \cap A' = \varnothing \Rightarrow [(A \cap A') \cup A] \cup B = [\varnothing \cup A] \cup B$

$= A \cup B$

Yanıt / Answer D

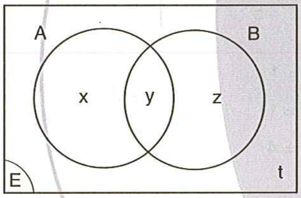
8.



Taralı alan / *The shaded area* = $B \setminus (A \cup C)$

Yanıt / Answer E

9.

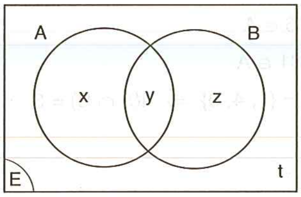


$A - B = x$

$B' = \{x, t\} \Rightarrow (A \setminus B) \setminus B' = x \setminus \{x, t\} = \varnothing$

Yanıt / Answer A

10.



$A \cap B' = \{x, y\} \cap \{x, t\} = x$

$A' \cup B = \{z, t\} \cup \{y, z\} = \{y, z, t\}$

$(A \cap B') \cap (A' \cup B) = x \cap \{y, z, t\} = \varnothing$

Yanıt / Answer B

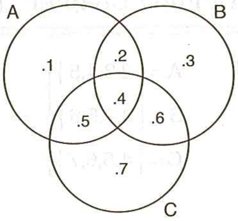
11. $A = \{1, 2, 4, 5\}$

$B' = \{1, 5, 7\}$

$C = \{4, 5, 6, 7\}$

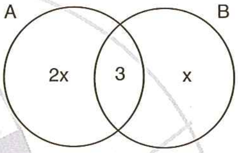
$B' \cup C = \{1, 4, 5, 6, 7\}$

$A \setminus (B' \cup C) = \{2\}$



Yanıt / Answer D

12.



$$\left.\begin{aligned} n(A \setminus B) &= 2x \\ n(B \setminus A) &= x \\ n(A \cap B) &= 3 \end{aligned}\right\} \Rightarrow n(A) = 2x + 3 = 11 \Rightarrow x = 4$$

$n(B \setminus A) = 4$

Yanıt / Answer A

13. $n(A) + n(A') = n(E) = 7 + 4 = 11$

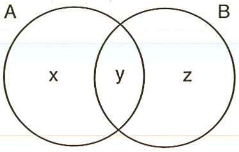
$n(B) + n(B') = n(E) = 11$

$n(B) + 6 = 11$

$n(B) = 5$

Yanıt / Answer B

14.



$n(A \cup B) = x + y + z = 9$

$n(A \setminus B) = 2n(B) \Rightarrow x = 2y + 2z$

$n(A \cap B) = y = 1$

$x + y + z = 2y + 2z + y + z = 9 \Rightarrow y + z = 3$

$\Rightarrow y = 1 \Rightarrow z = 2 \Rightarrow x = 6 \Rightarrow n(A) = x + y = 7$

Yanıt / Answer C

1. $\left.\begin{array}{l} n(E)=25,\ n(A\setminus B)=12 \\ n(B\setminus A)=4,\ n(A\cup B)'=5 \end{array}\right\} \Rightarrow \mathbf{n(A\cap B)=?}$

A) 1 B) 2 C) 3 D) 4 E) 5

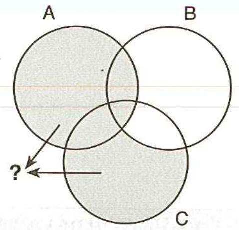
2. $\left.\begin{array}{l} A=\{1, \{2,3\}, 4, 5\} \\ B=\{1, 3, 4, \{5\}\} \\ C=\{\{1\}, 3, 4, 5\} \end{array}\right\} \Rightarrow \mathbf{A\cap B\cap C=?}$

A) {1} B) {1, 3, 4} C) {4, 5}
D) {4} E) Ø

3. $\left.\begin{array}{l} A=\{x \mid -1\le x<4,\ x\in Z\} \\ B=\{y \mid -2\le y\le 2,\ y\in Z\} \end{array}\right\} \Rightarrow \mathbf{n(A\cup B)=?}$

A) 4 B) 5 C) 6 D) 7 E) 8

4.



A) $A\cup(C\setminus A)$ B) $(C\setminus B)\cup A$ C) $A\cup C$
D) $B\setminus(A\cup C)$ E) $(C\setminus B)\cap A$

5. $\left.\begin{array}{l} A=\{x \mid -3<x<5,\ x\in Z\} \\ B=\{y \mid y<-1,\ y\in Z\} \end{array}\right\} \Rightarrow \mathbf{A\cap B=?}$

A) {−1, −2} B) {0, 1, 2} C) {−3}
D) {−1} E) {−2}

6. $\left.\begin{array}{l} A=(0,4] \\ B=(2,5) \end{array}\right\} \Rightarrow \mathbf{A\cup B=?}$

A) (0, 4] B) (0, 5) C) (2, 4]
D) (0, 2) E) (1, 5)

7. $\left.\begin{array}{l} A=\{x \mid 1\le x\le 200,\ x=3k,\ k\in Z\} \\ B=\{y \mid 1\le y\le 200,\ y=5k,\ k\in Z\} \end{array}\right\} \Rightarrow \mathbf{n(A\cap B)=?}$

A) 13 B) 14 C) 15 D) 17 E) 20

8. $\left.\begin{array}{l} n(A)=11 \\ n(B)=16 \end{array}\right\} \Rightarrow \mathbf{\min(n(A\cup B))=?}$

A) 20 B) 19 C) 18 D) 17 E) 16

9. $\left.\begin{array}{l} A \cup B = \{1,2,3,4\} \\ A \cup C = \{1,2,3,5,6\} \end{array}\right\} \Rightarrow A \cup (B \cap C) = ?$

A) {1, 2, 3} B) {4} C) {5, 6} D) {3, 4} E) Ø

10. $[(A \cap B') \cup (A' \cup B)]' = ?$

A) E B) A C) B D) A′ E) Ø

11. $\left.\begin{array}{l} A \cap B \neq \varnothing \\ n(A) = 15 \\ n(B) = 10 \end{array}\right\} \Rightarrow \max[n(A \setminus B) + n(B \setminus A)] = ?$

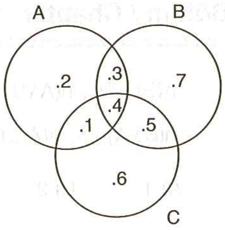
A) 21 B) 22 C) 23 D) 24 E) 25

12. $\left.\begin{array}{l} n(A \cup B) = 18 \\ n(A \cap B) = 3 \\ n(A \setminus B) = 2 \cdot n(B) \end{array}\right\} \Rightarrow n(B) = ?$

A) 3 B) 4 C) 5 D) 6 E) 8

13. $A \cup B \cup C = E.$

$A \setminus (B' \cup C) \doteq ?$



A) {1, 3} B) {2, 3} C) {1, 2, 3} D) {1, 2, 3, 4} E) {3}

14. $\left.\begin{array}{l} B \not\subset A,\ n(A \setminus B) = n(B) \\ n(A \cup B) = 18 \end{array}\right\} \Rightarrow \max(n(A \cap B)) = ?$

A) 7 B) 8 C) 9 D) 10 E) 11

15. $n(A \cup B) = 17$

$n(A \cap B) = 4$

$n(A) = 2 \cdot n(B)$

$\Rightarrow n(A) = ?$

A) 9 B) 14 C) 12 D) 13 E) 10

[YTÜ-YÖS 2012]

Yanıtlar / Answers

1. D	4. B	7. A	10. E	13. E
2. D	5. E	8. E	11. C	14. B
3. C	6. B	9. A	12. D	15. B

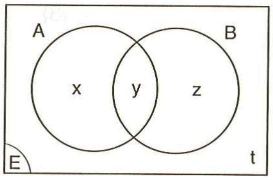
1. $n(E) = x + y + z + t = 25$

$n(A \setminus B) = x = 12$

$n(B \setminus A) = z = 4$

$n(A \cup B)' = t = 5$

$\Rightarrow n(A \cap B) = 4$



Yanıt / Answer D

2.

$$\left.\begin{aligned} A &= \{1, \{2, 3\}, 4, 5\} \\ B &= \{1, 3, 4, \{5\}\} \\ C &= \{\{1\}, 3, 4, 5\} \end{aligned}\right\} \Rightarrow A \cap B \cap C = \{4\}$$

Yanıt / Answer D

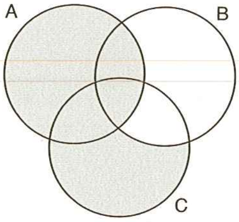
3. $A = \{x \mid -1 \le x < 4,\ x \in Z\} \Rightarrow A = \{-1, 0, 1, 2, 3\}$

$B = \{y \mid -2 \le y \le 2,\ y \in Z\} \Rightarrow B = \{-2, -1, 0, 1, 2\}$

$\Rightarrow A \cup B = \{-2, -1, 0, 1, 2, 3\} \Rightarrow n(A \cup B) = 6$

Yanıt / Answer C

4.



Taralı Alan / *The shaded area* = $(C \setminus B) \cup A$

Yanıt / Answer B

5. $A = \{x \mid -3 < x < 5,\ x \in Z\} \Rightarrow A = \{-2, -1, 0, 1, 2, 3, 4\}$

$B = \{y \mid y < -1,\ y \in Z\} \Rightarrow B = \{\ldots, -3, -2\}$

$\Rightarrow A \cap B = \{-2\}$

Yanıt / Answer E

6. $A = (0, 4] = \{x \mid 0 < x \le 4,\ x \in R\}$

$B = (2, 5) = \{x \mid 2 < x < 5,\ x \in R\}$

$A \cup B = (0, 4] \cup (2, 5) = \{x \mid 0 < x < 5,\ x \in R\}$

$= (0, 5)$

Yanıt / Answer B

7. $A \cap B = \{z \mid 1 \le z \le 200,\ z = 15k\}$

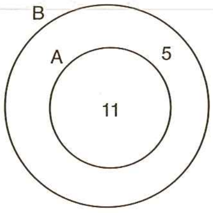
$A \cap B = \{15, 30, \ldots, 195\}$

$\Rightarrow n(A \cap B) = \dfrac{195 - 15}{15} + 1 = 13$

Yanıt / Answer A

8. $n(A \cup B) = n(A) + n(B) - n(A \cap B)$,

$\min (n(A \cup B)) \Rightarrow \max (n(A \cap B)) = n(A) = 11$



$\Rightarrow n(A \cup B) = 16$

Yanıt / Answer E

9. $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

$= \{1, 2, 3, 4\} \cap \{1, 2, 3, 5, 6\}$

$= \{1, 2, 3\}$

Yanıt / Answer A

10. $[(A \cap B') \cup (A' \cup B)]' = (A \cap B')' \cap (A' \cup B)'$

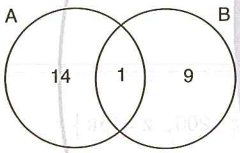
$= (A \setminus B)' \cap (A \cap B')$

$= (A \setminus B)' \cap (A \setminus B)$

$= \varnothing$

Yanıt / Answer E

11.



$A \cap B \neq \varnothing \Rightarrow n(A \cap B) = 1$

$\Rightarrow \max [n(A \setminus B) + n(B \setminus A)] = 14 + 9 = 23$

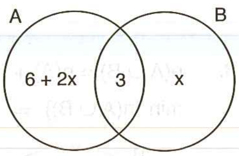
Yanıt / Answer C

12. $n(A \cup B) = 6 + 2x + 3 + x$

$18 = 9 + 3x$

$x = 3$

$\Rightarrow n(B) = x + 3 = 3 + 3 = 6$



Yanıt / Answer D

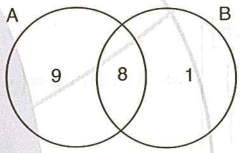
13. $A \setminus (B' \cup C) = \{1, 2, 3, 4\} \setminus (\{1, 2, 6\} \cup \{1, 4, 5, 6\})$

$= \{1, 2, 3, 4\} \setminus \{1, 2, 4, 5, 6\}$

$= \{3\}$

Yanıt / Answer E

14.



$A \cup B = (A \setminus B) \cup B$

$n(A \cup B) = n(A \setminus B) + n(B)$

$18 = n(A \setminus B) + n(A \setminus B)$

$9 = n(A \setminus B)$

$B \not\subset A \Rightarrow \min n(B \setminus A) = 1$

$\Rightarrow \max n(A \cap B) = 8$

Yanıt / Answer B

15. $n(A \cup B) = n(A) + n(B) - n(A \cap B$

$17 = n(A) + n(B) - 4$

$n(B) = x \Rightarrow n(A) = 2x$

$17 = 2x + x - 4 \Rightarrow x = 7$

$n(A) = 2x = 2 \cdot 7 = 14$

Yanıt / Answer B

1. $\left.\begin{array}{l} n(A\setminus B)=4 \\ n(B)=7 \end{array}\right\} \Rightarrow$ **$n(A\cup B)=?$**

A) 9 B) 10 C) 11 D) 12 E) 13

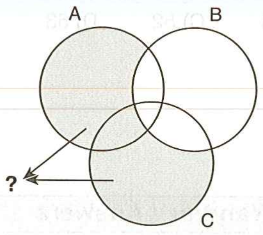
2. $\left.\begin{array}{l} n(A')=12 \\ n(B)=9 \\ n(A'\cap B')=5 \end{array}\right\} \Rightarrow$ **$n(A\cap B)=?$**

A) 0 B) 1 C) 2 D) 3 E) 4

3. **$[(A\setminus B')\setminus B]\cap(A\cap A')=?$**

A) Ø B) E C) A D) B E) A′

4.



A) $A\cup B$ B) $(A\cup C)\setminus B$ C) $(A\cap C)\cup B$

D) $(A\cup B)\cap C$ C) $B'\cap A$

5. $\left.\begin{array}{l} n(A\cup B)=57 \\ n(A\setminus B)=20 \\ n(A\cap B)=10 \end{array}\right\} \Rightarrow$ **$n(B\setminus A)=?$**

A) 27 B) 29 C) 33 D) 37 E) 39

6. $\left.\begin{array}{l} A=\{x \mid x\in N,\ 1<x<9\} \\ B=\{x \mid x\in Z,\ |x-2|<5\} \\ C=\{x \mid x\in N,\ 2^x<128\} \end{array}\right\} \Rightarrow$ **$n[(A\cup C)\setminus B]=?$**

A) 1 B) 2 C) 3 D) 4 E) 5

7. $\left.\begin{array}{l} n(A\setminus B)=2\cdot n(A\cap B) \\ n(B\setminus A)=3\cdot n(A) \\ n(A\cup B)=48 \end{array}\right\} \Rightarrow$ **$n(A\cap B)=?$**

A) 1 B) 2 C) 3 D) 4 E) 5

8. $\left.\begin{array}{l} n(B\cap A')=7 \\ n(A)=12 \end{array}\right\} \Rightarrow$ **$n(A\cup B)=?$**

A) 14 B) 15 C) 16 D) 18 E) 19

9. $\left.\begin{array}{l} A=\{x \mid 0<x<376 \quad x=5k,\ k\in N \\ B=\{x \mid 0<x<376 \quad x=7k,\ k\in N \end{array}\right\} \Rightarrow \mathbf{n(A\cap B)=?}$

A) 8 B) 10 C) 12 D) 14 E) 16

10. $A\cap B \neq \varnothing \quad \Rightarrow \quad \mathbf{[(A'\cap B')\cup(A'\cap B)]'=?}$

A) A B) B C) A′ D) B′ E) E

11. $\left.\begin{array}{l} A=\{x \mid x=3k,\ \ 10<x<50,\ \ k\in N \\ B=\{x \mid y=5k,\ \ 20<y<100,\ k\in N \end{array}\right\} \Rightarrow \mathbf{n(B\setminus A)=?}$

A) 11 B) 12 C) 13 D) 232 E) 233

12. $\left.\begin{array}{l} A=(-5,7] \\ B=[2,9) \end{array}\right\} \Rightarrow \mathbf{A\setminus B=?}$

A) (–5, 1] B) [–5, 1] C) (–5, 3]
D) (2, 7) E) (–5, 2)

13. $\left.\begin{array}{l} A\subset B,\ \ n(A)'=15,\ n(B)'=7 \\ n(A\cup B)=10 \end{array}\right\} \Rightarrow \mathbf{n(A)+n(B)=?}$

A) 8 B) 10 C) 12 D) 14 E) 16

14. $A\cap B\neq\varnothing$

$n(A) = 12,\ \ n(B) = 8$

$\Rightarrow$ **max[n(A ∪ B)] + min[n(A ∩ B)] = ?**

A) 29 B) 30 C) 31 D) 32 E) 33

15. $\left.\begin{array}{l} n(A)'=7, \quad n(A'\setminus B)=4 \\ n(B\setminus A)'=8 \end{array}\right\} \Rightarrow \mathbf{n(E)=?}$

A) 13 B) 11 C) 10 D) 9 E) 8

16. $A = \{x \mid x = 4k,\ k\in N^+,\ x < 210\} \Rightarrow$ **n(A) = ?**

A) 49 B) 51 C) 52 D) 53 E) 54

Yanıtlar / Answers

1. C	4. B	7. D	10. A	13. C	16. C
2. C	5. A	8. E	11. C	14. C	
3. A	6. B	9. B	12. E	15. B	

1. $A \cup B = (A \setminus B) \cup B$

$\Rightarrow n(A \cup B) = n(A \setminus B) + n(B)$

$= 4 + 7 = 11$

Yanıt / Answer C

2. $n(A' \cap B') = n(A \cup B)' = 5$

$n(A') = 12 = n(B \setminus A) + n(A \cup B)'$

$n(A \cup B)' = 5 \Rightarrow n(B \setminus A) = 7$

$n(B) = n(B \setminus A) + n(A \cap B)$

$9 = 7 + n(A \cap B)$

$\Rightarrow n(A \cap B) = 2$

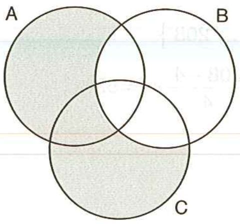
Yanıt / Answer C

3. $[(A \setminus B') \setminus B] \cap (A \cap A') = [(A \setminus B') \setminus B] \cap \varnothing$

$= \varnothing$

Yanıt / Answer A

4.



Taralı Alan / *The shaded area* = $(A \cup C) \setminus B$

Yanıt / Answer B

5. $n(A \cup B) = n(A \setminus B) + n(B \setminus A) + n(A \cap B)$

$57 = 20 + 10 + n(B \setminus A)$

$\Rightarrow n(B \setminus A) = 27$

Yanıt / Answer A

6. $A = \{2, 3, 4, \ldots, 8\}$

$B = \{x \mid x \in Z, -5 < x - 2 < 5\}$

$= \{x \mid x \in Z, -3 < x < 7\} = \{-2, -1, \ldots, 6\}$

$C = \{0, 1, 2, 3, 4, 5, 6\}$

$[(A \cup C) \setminus B] = \{0, 1, \ldots, 8\} \setminus \{-2, -1, \ldots, 6\} = \{7, 8\}$

$\Rightarrow n[(A \cup C) \setminus B] = 2$

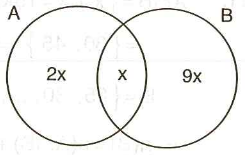
Yanıt / Answer B

7. $n(A \cup B) = 2x + x + 9x$

$48 = 12x$

$x = 4$

$\Rightarrow n(A \cap B) = 4$



Yanıt / Answer D

8. $n(B \cap A') = n(B \setminus A) = 7$

$n(A \cup B) = n(B \setminus A) + n(A)$

$= 7 + 12 = 19$

Yanıt / Answer E

9. $A \cap B = \{x \mid 0 < x < 376,\ x = 35k,\ k \in N\}$

$= \{35,\ 70,\ \ldots,\ 350\}$

$\Rightarrow n(A \cap B) = \dfrac{350 - 35}{35} + 1 = 10$

Yanıt / Answer B

10. $[(A' \cap B') \cup (A' \cup B)]' = [(A' \cap B')' \cap (A' \cup B)']$

$= [(A \cup B) \cap (A \cap B')]$

$= A \cup (B \cap B')$

$= A \cup \varnothing = A$

Yanıt / Answer A

11. $A \cap B = \{x \mid x = 15k,\ 20 < x < 50\}$

$= \{30,\ 45\} \Rightarrow n(A \cap B) = 2$

$B = \{25,\ 30,\ \ldots,\ 95\} \Rightarrow n(B) = \dfrac{95 - 25}{5} + 1 = 15$

$\Rightarrow n(B) = n(A \cap B) + n(B \setminus A)$

$15 = 2 + n(B \setminus A)$

$\Rightarrow n(B \setminus A) = 13$

Yanıt / Answer C

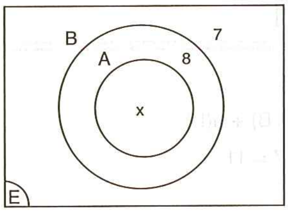
12. $A = \{x : -5 < x \leq 7,\ x \in R\}$

$B = \{x : 2 \leq x < 9,\ x \in R\}$

$\Rightarrow A \setminus B = \{x : -5 < x < 2\} = (-5,\ 2)$

Yanıt / Answer E

13.



$n(A \cup B) = 8 + x = 10$

$x = 2$

$\Rightarrow n(A) + n(B) = x + 8 + x = 2 + 8 + 2 = 12$

Yanıt / Answer C

14. $A \cap B \neq \varnothing \Rightarrow \min(n(A \cap B)) = 1$

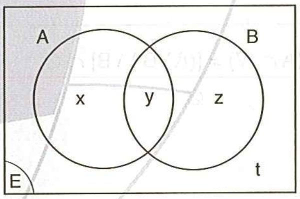
$A \cap B \neq \varnothing \Rightarrow \max(n(A \cap B)) = 8$

$\Rightarrow \max(n(A \cup B)) + \min(n(A \cup B)) = (20 - 1) + (20 - 8)$

$= 31$

Yanıt / Answer C

15.



$n(A' \setminus B) = t = 4$

$n(A)' = z + t = 7 \Rightarrow z = 3$

$n(B \setminus A)' = x + y + t = 8 \Rightarrow x + y = 4$

$\Rightarrow n(E) = x + y + z + t = 4 + 3 + 4 = 11$

Yanıt / Answer B

16. $A = \{4,\ 8,\ \ldots,\ 208\}$

$\Rightarrow n(A) = \dfrac{208 - 4}{4} + 1 = 52$

Yanıt / Answer C

Fonksiyonlar / Functions

Test 1

1. $\left.\begin{array}{l} f: A \to B \\ f(x) = 5x+3 \\ A = \{2,3,4,5\} \end{array}\right\} \Rightarrow$ **B = ?**

A) {13, 18, 20, 25}
B) {13, 18, 23, 28}
C) {13, 19, 23, 29}
D) {13, 19, 22, 29}
E) {13, 17, 23, 27}

2. f = {(2, 4), (1, 3), (3, 4), (4, –2)}

$\Rightarrow$ **f(2) – f(3) + f(4) = ?**

A) –2 B) –1 C) 0 D) 2 E) 4

3. $\left.\begin{array}{l} f: Z \to Z \\ y = f(x) = -2x+3 \end{array}\right\} \Rightarrow \dfrac{\mathbf{f(4)-f(5)}}{\mathbf{f(2)}} = \mathbf{?}$

A) –4 B) –3 C) –2 D) –1 E) 2

4. $\left.\begin{array}{l} f: A \to B \\ f(x) = 3x-1 \\ B = \{8, 11, 17\} \end{array}\right\} \Rightarrow$ **A = ?**

A) {3, 4, 5}
B) {2, 3, 4}
C) {3, 5, 6}
D) {2, 5, 6}
E) {3, 4, 6}

5. $\left.\begin{array}{l} f: R \to R \\ f(x) = x^2+3 \end{array}\right\} \Rightarrow$ **f(2) + f(–1) = ?**

A) 3 B) 5 C) 6 D) 9 E) 11

6. f:R → R

$$f(x) = \begin{cases} x+1 & x < -3 \\ x^2+1 & -3 \le x < 3 \\ 2x+3 & 3 \le x \end{cases} \Rightarrow \mathbf{f(1)+f(4)-f(-4) = ?}$$

A) 15 B) 16 C) 18 D) 21 E) 24

7. f : R → R, f(x) = 2x – 5 $\Rightarrow$ **f(3) – f(5) + f(1) = ?**

A) –7 B) –5 C) 3 D) 5 E) 9

8. f : R → R, f(x) = 3x – 7 $\Rightarrow$ **f(2x + 1) = ?**

A) 3x + 2
B) 3x – 2
C) 3x – 4
D) 6x – 4
E) 6x + 4

9. $\left.\begin{matrix} f(x)=3x-5 \\ g(x)=5x+3 \end{matrix}\right\} \Rightarrow \mathbf{f(3)-g(-2)=?}$

A) –2 B) 7 C) 9 D) 10 E) 11

10. $\left.\begin{matrix} f(x)=\dfrac{2x-3}{5} \\ g(x)=5x-6 \\ f(9)+g(a)=17 \end{matrix}\right\} \Rightarrow \mathbf{a=?}$

A) 3 B) 4 C) 5 D) 6 E) 8

11. $f(x) = 2^{x-1} \quad \Rightarrow \mathbf{f(3) - f(1) = ?}$

A) 3 B) 4 C) 6 D) 7 E) 9

12. $\left.\begin{matrix} f(x)=2^{x-2} \\ 3\cdot f(x+2)-f(x+3)=16 \end{matrix}\right\} \Rightarrow \mathbf{x=?}$

A) 1 B) 2 C) 3 D) 4 E) 5

13. $\left.\begin{matrix} f(x)=3x+4 \\ g(x)=1-3x \\ f(3)=g(a) \end{matrix}\right\} \Rightarrow \mathbf{a=?}$

A) 3 B) 2 C) –4 D) –2 E) –1

14. $\left.\begin{matrix} f(x)=2x-3 \\ g(x)=x+1 \end{matrix}\right\} \Rightarrow \mathbf{2\cdot f(2x)-3\cdot g(3x-1)=?}$

A) –x– 2 B) –x– 5 C) x – 6
D) –x – 6 E) x + 6

15. $f{:}\,R \to R$

$$f(x)=\begin{cases} 2x+3 & x>4 \\ x & x=4 \\ x-4 & x<4 \end{cases} \Rightarrow \mathbf{f(-3)+f(4)+f(7)=?}$$

A) 8 B) 12 C) 14 D) 16 E) 18

16. $f(x)=\dfrac{x+1}{2}$

$(fog)(x)=\dfrac{x^2+2}{2} \Rightarrow \mathbf{g(-1)=?}$

A) –1 B) 1 C) 0
D) –2 E) 2

[AKDENİZ ÜNV. YÖS 2013]

Yanıtlar / Answers

1. B	4. E	7. A	10. B	13. C	16. E
2. A	5. E	8. D	11. A	14. D	
3. C	6. B	9. E	12. D	15. C	

1. $f(x) = 5x + 3 \qquad A = \{2, 3, 4, 5\}$

$f(2) = 5\cdot2 + 3 = 13$

$f(3) = 5\cdot3 + 3 = 18$

$f(4) = 5\cdot4 + 3 = 23$

$f(5) = 5\cdot5 + 3 = 28$

$\Rightarrow B = \{13, 18, 23, 28\}$

Yanıt / Answer B

2. $f = \{ (2, 4), (1, 3), (3, 4), (4, -2) \}$

$\Rightarrow f(2) - f(3) + f(4) = 4 - 4 + (-2) = -2$

Yanıt / Answer A

3. $f(x) = -2x + 3$

$f(4) = -2\cdot4 + 3 = -5$

$f(5) = -2\cdot5 + 3 = -7$

$f(2) = -2\cdot2 + 3 = -1$

$$\Rightarrow \frac{f(4) - f(5)}{f(2)} = \frac{-5+7}{-1} = -2$$

Yanıt / Answer C

4. $f(x) = 3x - 1 \qquad B = \{8, 11, 17\}$

$3x - 1 = 8 \qquad 3x - 1 = 11 \qquad 3x - 1 = 17$

$3x = 9 \qquad 3x = 12 \qquad 3x = 18$

$x = 3 \qquad x = 4 \qquad x = 6$

$\Rightarrow A = \{3, 4, 6\}$

Yanıt / Answer E

5. $f(x) = x^2 + 3$

$f(2) = 2^2 + 3 = 7$

$f(-1) = (-1)^2 + 3 = 4$

$\Rightarrow f(2) + f(-1) = 7 + 4 = 11$

Yanıt / Answer E

6.
$$f(x) = \begin{cases} x + 1, & x < -3 \\ x^2 + 1, & -3 \le x < 3 \\ 2x + 3, & 3 \le x \end{cases}$$

$1 < 3 \Rightarrow f(1) = 1^2 + 1 = 2$

$3 < 4 \Rightarrow f(4) = 2\cdot4 + 3 = 11$

$-4 < -3 \Rightarrow f(-4) = -4 + 1 = -3$

$\Rightarrow f(1) + f(4) - f(-4) = 2 + 11 - (-3) = 16$

Yanıt / Answer B

7. $f(x) = 2x - 5$

$f(3) = 2\cdot3 - 5 = 1$

$f(5) = 2\cdot5 - 5 = 5$

$f(1) = 2\cdot1 - 5 = -3$

$\Rightarrow f(3) - f(5) + f(1) = 1 - 5 + (-3) = -7$

Yanıt / Answer A

8. $f(x) = 3x - 7$

$f(2x + 1) = 3(2x + 1) - 7$

$f(2x + 1) = 6x + 3 - 7$

$f(2x + 1) = 6x - 4$

Yanıt / Answer D

9. $f(x) = 3x - 5$

$g(x) = 5x + 3$

$f(3) - g(-2) = 3 \cdot 3 - 5 - [5 \cdot (-2) + 3]$

$= 9 - 5 - (-10 + 3)$

$= 4 - (-7) = 11$

Yanıt / Answer E

10. $f(x) = \frac{2x-3}{5}$ $\qquad g(x) = 5x - 6$

$f(9) + g(a) = 17$

$\frac{2 \cdot 9 - 3}{5} + 5a - 6 = 17$

$3 + 5a = 23$

$5a = 20$

$a = 4$

Yanıt / Answer B

11. $f(3) - f(1) = 2^{3-1} - 2^{1-1}$

$= 2^2 - 2^0$

$= 4 - 1 = 3$

Yanıt / Answer A

12. $f(x) = 2^{x-2}$

$3 f(x+2) - f(x+3) = 16$

$3 \cdot 2^{x+2-2} - 2^{x+3-2} = 16$

$3 \cdot 2^x - 2^{x+1} = 16$

$3 \cdot 2^x - 2 \cdot 2^x = 2^4$

$2^x = 2^4 \Rightarrow x = 4$

Yanıt / Answer D

13. $f(x) = 3x + 4, \qquad g(x) = 1 - 3x$

$f(3) = g(a) \Rightarrow 3 \cdot 3 + 4 = 1 - 3 \cdot a$

$13 = 1 - 3a$

$3a = -12$

$a = -4$

Yanıt / Answer C

14. $f(x) = 2x - 3$

$g(x) = x + 1$

$2 \cdot f(2x) - 3 \cdot g(3x - 1) = 2(2 \cdot 2x - 3) - 3 \cdot (3x - 1 + 1)$

$= 2(4x - 3) - 3 \cdot 3x$

$= 8x - 6 - 9x$

$= -x - 6$

Yanıt / Answer D

15. $$f(x) = \begin{cases} 2x+3, & x > 4 \\ x, & x = 4 \\ x-4, & x < 4 \end{cases}$$

$-3 < 4 \Rightarrow f(-3) = -3 - 4 = -7$

$x = 4 \Rightarrow f(4) = 4$

$7 > 4 \Rightarrow f(7) = 2 \cdot 7 + 3 = 17$

$f(-3) + f(4) + f(7) = -7 + 4 + 17 = 14$

Yanıt / Answer C

16. $f(x) = \frac{x+1}{2} \Rightarrow f^{-1}(x) = 2x - 1$

$g(x) = (2x-1) \circ \left(\frac{x^2+2}{2}\right)$

$g(x) = x^2 + 1$

$\Rightarrow g(-1) = (-1)^2 + 1 = 2$

Yanıt / Answer E

1. $$f(x)=\begin{cases} ax^2+bx+1, & x>2 \\ \dfrac{4}{3a-b+x}, & x\le 2 \end{cases}$$

$f(2)=2 \Rightarrow \mathbf{\dfrac{b}{a}=?}$

A) 1 B) 2 C) 3 D) 4 E) 5

2. $$\left.\begin{array}{l} f(x)=x^2-4x+5 \\ g(x)=\dfrac{x-5}{3} \end{array}\right\} \Rightarrow \mathbf{(f-3\cdot g)(2)=?}$$

A) 4 B) 6 C) 8 D) 10 E) 12

3. $$\left.\begin{array}{l} f(x)=f(x+1)+x \\ f(1)=1 \end{array}\right\} \Rightarrow \mathbf{f(3)=?}$$

A) –3 B) –2 C) –1 D) 1 E) 3

4. $$\left.\begin{array}{l} f(x+2)=\dfrac{f(x+1)+3}{2} \\ f(5)=3 \end{array}\right\} \Rightarrow \mathbf{f(2)=?}$$

A) –2 B) –1 C) 0 D) 2 E) 3

5. $$\left.\begin{array}{l} x\cdot f(x+1)=2\cdot f(x) \\ f(5)=6 \end{array}\right\} \Rightarrow \mathbf{f(1)=?}$$

A) 6 B) 7 C) 8 D) 9 E) 10

6. $f(3x)+f(2x+1)=10$

$\Rightarrow$ **$f(3)-f(5)-f(6)=?$**

A) –2 B) –3 C) –4 D) –5 E) –6

7. $$\left.\begin{array}{l} f:A\to B, \\ A=\{0,1\} \\ f(x-1)=2x^3-x^2-2x+2 \end{array}\right\} \Rightarrow \mathbf{B=?}$$

A) {–1, 10} B) {1, 10} C) {–1, –10}
D) {1, 5} E) {–1, –5}

8. $$\left.\begin{array}{l} f(x+2)=f(x)-2f(x+1) \\ f(0)=1 \\ f(1)=4 \end{array}\right\} \Rightarrow \mathbf{f(4)=?}$$

A) –43 B) –37 C) –18 D) 18 E) 43

9. $$\left.\begin{array}{l} f(x)=3+2\cdot f(x+1) \\ f(2)=5 \end{array}\right\} \Rightarrow \mathbf{f(5)=?}$$

A) –2 B) –1 C) 1 D) 2 E) 5

10. $$\left.\begin{array}{l} f:Z^{+}\rightarrow Z^{+} \\ f(1)=1 \\ f(x)=x\cdot f(x-1) \\ f(0)=1 \end{array}\right\} \Rightarrow \mathbf{f(2008)=?}$$

A) 2006! B) 2007! C) 2008! D) 2009! E) 2010!

11. $f(x)=3x-4 \Rightarrow \mathbf{f^{-1}(x)=?}$

A) $x-4$ B) $x+4$ C) $-3x+4$ D) $\dfrac{x+4}{3}$ E) $\dfrac{x-4}{3}$

12. $$\left.\begin{array}{l} f:R-\{6\}\rightarrow R-\{2\} \\ f(x)=\dfrac{2x-5}{x-6} \end{array}\right\} \Rightarrow \mathbf{f^{-1}(x)=?}$$

A) $\dfrac{-2x-5}{x-6}$ B) $\dfrac{-6x-5}{x+2}$ C) $\dfrac{6x-5}{x-2}$ D) $\dfrac{-6x+5}{x+2}$ E) $\dfrac{2x+5}{x+6}$

13. $f(x)=\{(2,3),(1,2),(3,5),(4,7)\}$

$\Rightarrow \mathbf{f^{-1}(3)+f^{-1}(7)-f(3)=?}$

A) 0 B) 1 C) 2 D) 3 E) 5

14. $$\left.\begin{array}{l} f(x)=\dfrac{3x+4a}{x-2} \\ f^{-1}(4)=12 \end{array}\right\} \Rightarrow \mathbf{a=?}$$

A) 1 B) 2 C) 3 D) 4 E) 6

15. $$\left.\begin{array}{l} f(2x+3)=3x+a \\ f^{-1}(5)=9 \end{array}\right\} \Rightarrow \mathbf{a=?}$$

A) –6 B) –5 C) –4 D) –3 E) –2

16. $f(x)=\dfrac{1}{x}$,

$g(x+1)=2x-3.$

$\mathbf{(g^{-1}o\,f^{-1})^{-1}(x)=?}$

A) $\dfrac{x-1}{x+1}$ B) $\dfrac{1}{2x-5}$ C) $\dfrac{1}{2x}$ D) $\dfrac{x}{x+1}$ E) $\dfrac{5x}{x-1}$

[YTÜ-YÖS 2012]

Yanıtlar / Answers

1. C	4. E	7. B	10. C	13. B	16. B
2. A	5. D	8. A	11. D	14. A	
3. B	6. D	9. A	12. C	15. C	

1.

$$2 \le 2 \Rightarrow f(2) = \frac{4}{3a-b+2} = 2$$
$$3a-b+2=2$$
$$3a-b=0 \Rightarrow b=3a$$
$$\Rightarrow \frac{b}{a}=3$$

Yanıt / Answer C

2.

$$f(x)=x^2-4x+5$$
$$g(x)=\frac{x-5}{3}$$
$$(f-3g)(x)=x^2-4x+5-3\left(\frac{x-5}{3}\right)$$
$$=x^2-4x+5-x+5$$
$$=x^2-5x+10$$
$$(f-3\cdot g)(2)=2^2-5\cdot 2+10=4$$

Yanıt / Answer A

3.

$$f(x)=f(x+1)+x \quad , \quad f(1)=1$$
$$f(1)=f(2)+1$$
$$+\quad f(2)=f(3)+2$$
$$f(1)+f(2)=f(2)+f(3)+3$$
$$f(1)=f(3)+3$$
$$1=f(3)+3 \Rightarrow f(3)=-2$$

Yanıt / Answer B

4.

$$f(x+2)=\frac{f(x+1)+3}{2} \Rightarrow 2f(x+2)=f(x+1)+3$$
$$4/\ 2f(5)=f(4)+3$$
$$2/\ 2f(4)=f(3)+3$$
$$+\quad 2f(3)=f(2)+3$$
$$8f(5)=12+6+f(2)+3$$
$$8\cdot 3=21+f(2)$$
$$f(2)=3$$

Yanıt / Answer E

5.

$$x\cdot f(x+1)=2f(x)$$
$$4f(5)=2f(4)$$
$$3f(4)=2f(3)$$
$$2f(3)=2f(2)$$
$$f(2)=2f(1)$$
$$24\cdot f(5)\cdot f(4)\cdot f(3)\cdot f(2)=16\cdot f(4)\cdot f(3)\cdot f(2)\cdot f(1)$$
$$24\cdot f(5)=16\cdot f(1)$$
$$24\cdot 6=16\cdot f(1) \Rightarrow f(1)=9$$

Yanıt / Answer D

6.

$$f(3x)+f(2x+1)=10$$
$$x=1 \Rightarrow f(3)+f(3)=10$$
$$2f(3)=10$$
$$f(3)=5$$
$$x=2 \Rightarrow f(6)+f(5)=10$$
$$f(3)-f(5)-f(6)=f(3)-[f(5)+f(6)]$$
$$=5-10=-5$$

Yanıt / Answer D

7.

$$A=\{0,1\}$$
$$x-1=0 \Rightarrow x=1$$
$$f(1-1)=2\cdot 1^3-1^2-2\cdot 1+2$$
$$f(0)=2-1-2+2=1$$
$$x-1=1 \Rightarrow x=2$$
$$f(2-1)=2\cdot 2^3-2^2-2\cdot 2+2$$
$$f(1)=16-4-4+2=10$$
$$\Rightarrow B=\{1,10\}$$

Yanıt / Answer B

8.

$$f(x+2)=f(x)-2f(x+1)$$
$$x=0 \Rightarrow f(2)=f(0)-2f(1)$$
$$f(2)=1-2\cdot 4=-7$$
$$x=1 \Rightarrow f(3)=f(1)-2f(2)$$
$$=4-2(-7)=18$$
$$x=2 \Rightarrow f(4)=f(2)-2f(3)$$
$$=-7-2\cdot 18=-43$$

Yanıt / Answer A

9. $f(x) = 3 + 2f(x + 1)$

$x = 2 \Rightarrow f(2) = 3 + 2f(3)$

$5 = 3 + 2f(3) \Rightarrow f(3) = 1$

$x = 3 \Rightarrow f(3) = 3 + 2f(4)$

$1 = 3 + 2f(4) \Rightarrow f(4) = -1$

$x = 4 \Rightarrow f(4) = 3 + 2f(5)$

$-1 = 3 + 2f(5) \Rightarrow f(5) = -2$

Yanıt / Answer A

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10. $f(x) = x \cdot f(x-1)$

$f(1) = 1 \cdot f(0)$

$f(2) = 2 \cdot f(1)$

$f(3) = 3 \cdot f(2)$

$\vdots$

$f(2008) = 2008 \cdot f(2007)$

$f(2008) = 1 \cdot 2 \cdot 3 \ldots 2008 \cdot f(0)$

$f(2008) = 2008! \cdot 1$

$f(2008) = 2008!$

Yanıt / Answer C

---

11. $f(x) = 3x - 4$

$y = 3x - 4$

$y + 4 = 3x$

$\dfrac{y+4}{3} = x$

$\Rightarrow f^{-1}(x) = \dfrac{x+4}{3}$

Yanıt / Answer D

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12. $f(x) = \dfrac{ax+b}{cx+d} \Rightarrow f^{-1}(x) = \dfrac{-dx+b}{cx-a}$

$f(x) = \dfrac{2x-5}{x-6} \Rightarrow f^{-1}(x) = \dfrac{6x-5}{x-2}$

Yanıt / Answer C

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13. $f(x) = \{ (2, 3), (1, 2), (3, 5), (4, 7) \}$

$f(2) = 3 \Rightarrow f^{-1}(3) = 2$

$f(1) = 2 \Rightarrow f^{-1}(2) = 1$

$f(3) = 5 \Rightarrow f^{-1}(5) = 3$

$f(4) = 7 \Rightarrow f^{-1}(7) = 4$

$f^{-1}(3) + f^{-1}(7) - f(3) = 2 + 4 - 5 = 1$

Yanıt / Answer B

---

14. $f(x) = \dfrac{3x+4a}{x-2}$

$f^{-1}(4) = 12 \Rightarrow f(12) = 4$

$f(12) = \dfrac{3 \cdot 12 + 4a}{12-2} = 4$

$\dfrac{36+4a}{10} = 4$

$36 + 4a = 40$

$4a = 4 \Rightarrow a = 1$

Yanıt / Answer A

---

15. $f(2x + 3) = 3x + a$

$f^{-1}(5) = 9 \Rightarrow f(9) = 5$

$2x + 3 = 9$

$2x = 6$

$x = 3$

$3x + a = 5$

$3 \cdot 3 + a = 5$

$a = -4$

Yanıt / Answer C

---

16. $g(x+1) = 2x - 3 \Rightarrow g(x) = 2x - 5$

$(g^{-1} o\, f^{-1})^{-1}(x) = f(g(x)) = f(2x-5)$

$f(x) = \dfrac{1}{x} \Rightarrow f(2x-5) = \dfrac{1}{2x-5}$

Yanıt / Answer B

1. $\left.\begin{array}{l} f:R-\{2\}\to R-\{3\} \\ f(x)=\dfrac{3x-4}{x-2} \end{array}\right\} \Rightarrow \mathbf{f^{-1}(5)=?}$

A) 8 B) 6 C) 5

D) 4 E) 3

2. $\left.\begin{array}{l} f:R\setminus\{m\}\to R\setminus\{4\} \\ f(x)=\dfrac{4x-5}{x-m} \\ f(x)=f^{-1}(x) \end{array}\right\} \Rightarrow \mathbf{m=?}$

A) 2 B) 3 C) 4 D) 5 E) 8

3. $\left.\begin{array}{l} f:R\setminus\{3\}\to R\setminus\left\{\dfrac{1}{2}\right\} \\ f(x)=\dfrac{x-4}{2x+m} \end{array}\right\} \Rightarrow \mathbf{f^{-1}(-1)=?}$

A) $-\dfrac{1}{5}$ B) $-\dfrac{2}{5}$ C) $-\dfrac{3}{5}$ D) $-\dfrac{4}{5}$ E) $\dfrac{10}{3}$

4. $\left.\begin{array}{l} f(x-2)=2x+3 \\ f(m)=1 \end{array}\right\} \Rightarrow \mathbf{m=?}$

A) –3 B) –1 C) 0 D) 1 E) 3

5. $f(x)=2^{3x-2}+5 \Rightarrow \mathbf{f^{-1}(6)=\ ?}$

A) $\dfrac{1}{3}$ B) $\dfrac{2}{3}$ C) $\dfrac{1}{5}$ D) $\dfrac{2}{5}$ E) $\dfrac{3}{5}$

6. $\left.\begin{array}{l} f(x)=ax+b \\ f(2)=3 \\ f(3)=2 \end{array}\right\} \Rightarrow \mathbf{f^{-1}(-1)=?}$

A) 3 B) 4 C) 5 D) 6 E) 7

7. $\left.\begin{array}{l} f^{-1}(5a-3x)=2x+3 \\ f(x+5)=\dfrac{8a-3x}{2} \end{array}\right\} \Rightarrow \mathbf{a=?}$

A) 2 B) 3 C) 4 D) 5 E) 6

8. $\left.\begin{array}{l} f:R-\{1\}\to R-\{a\} \\ f(x)=\dfrac{2x+1}{x-1} \end{array}\right\} \Rightarrow \mathbf{a=?}$

A) –2 B) –1 C) 0 D) 1 E) 2

9. $\left.\begin{array}{l} f:\mathbb{R}\rightarrow\mathbb{R} \\ f(2x+1)=2mx+2 \\ f^{-1}(4)=3 \end{array}\right\} \Rightarrow \mathbf{m=?}$

A) 1 B) 2 C) 3 D) 4 E) 5

10. $\left.\begin{array}{l} f(3x-1)=mx-5 \\ f^{-1}(3)=-7 \end{array}\right\} \Rightarrow \mathbf{m=?}$

A) −7 B) −5 C) −4 D) 4 E) 5

11. $f(2x^2-5x)=4x^2-10x+3$

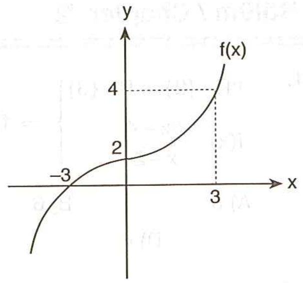
$\Rightarrow \mathbf{f(3)-f^{-1}(7)=?}$

A) 3 B) 5 C) 7 D) 9 E) 11

12. $\left.\begin{array}{l} f(x)=\dfrac{ax+1}{3x+4} \\ f(x)=f^{-1}(x) \end{array}\right\} \Rightarrow \mathbf{f(-1)=?}$

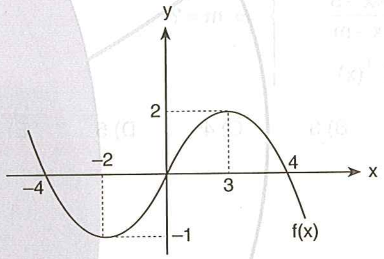
A) 1 B) 2 C) 3 D) 4 E) 5

13. $\mathbf{f^{-1}(2)+f^{-1}(4)=?}$



A) 0 B) 1 C) 2 D) 3 E) 4

14.



$\mathbf{f^{-1}(-1)+f^{-1}(2)-f(0)=?}$

A) 0 B) 1 C) 2 D) 3 E) 4

15. $f(x)=3^x+1$

$\Rightarrow \mathbf{f(x-1)=?}$

A) $2f(x)-2$ B) $3f(x)+1$ C) $2f(x)$

D) $\dfrac{2+f(x)}{3}$ E) $\dfrac{1+f(x)}{2}$

[YTÜ. YÖS 2013]

Yanıtlar / Answers

1. E	4. A	7. B	10. C	13. D
2. C	5. B	8. E	11. C	14. B
3. E	6. D	9. A	12. E	15. D

1. $f(x)=\dfrac{3x-4}{x-2} \Rightarrow f^{-1}(x)=\dfrac{2x-4}{x-3}$

$f^{-1}(5)=\dfrac{2\cdot5-4}{5-3}$

$=\dfrac{6}{2}=3$

Yanıt / Answer E

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2. $f(x)=\dfrac{4x-5}{x-m} \Rightarrow f^{-1}(x)=\dfrac{xm-5}{x-4}$

$f(x)=f^{-1}(x) \Rightarrow \dfrac{4x-5}{x-m}=\dfrac{xm-5}{x-4}$

$m=4$

Yanıt / Answer C

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3. $f:\mathbb{R}\setminus\{3\} \rightarrow \mathbb{R}\setminus\left\{\dfrac{1}{2}\right\} \Rightarrow x\neq3$

$f(x)=\dfrac{x-4}{2x+m} \Rightarrow x=3 \Rightarrow 2x+m=0$

$2\cdot3+m=0$

$m=-6$

$f(x)=\dfrac{x-4}{2x-6} \Rightarrow f^{-1}(x)=\dfrac{6x-4}{2x-1}$

$f^{-1}(-1)=\dfrac{6\cdot(-1)-4}{2\cdot(-1)-1}=\dfrac{-10}{-3}=\dfrac{10}{3}$

Yanıt / Answer E

---

4. $f(x-2)=2x+3$ ve (and) $f(m)=1$

$\Rightarrow 2x+3=1$

$2x=-2 \Rightarrow x=-1$

$x-2=m$

$-1-2=m \Rightarrow m=-3$

Yanıt / Answer A

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5 $f(x)=2^{3x-2}+5 \Rightarrow f^{-1}(2^{3x-2}+5)=x$

$2^{3x-2}+5=6$

$2^{3x-2}=1=2^{0}$

$3x-2=0$

$x=\dfrac{2}{3}$

Yanıt / Answer B

---

6. $f(x)=ax+b$

$f(2)=3 \Rightarrow \quad 2a+b=3$

$f(3)=2 \Rightarrow \quad -\,/\ 3a+b=2$

$-a=1 \Rightarrow a=-1$

$2a+b=3$

$2(-1)+b=3 \Rightarrow b=5$

$f(x)=-x+5 \Rightarrow f^{-1}(-x+5)=x$

$-x+5=-1$

$x=6$

$\Rightarrow f^{-1}(-1)=6$

Yanıt / Answer D

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7. $f^{-1}(5a-3x)=2x+3 \Rightarrow f(2x+3)=5a-3x$

$f(x)=5a-3\cdot\left(\dfrac{x-3}{2}\right)$

$f(x+5)=5a-3\cdot\left(\dfrac{x+5-3}{2}\right)$

$\Rightarrow f(x+5)=\dfrac{10a-3x-6}{2}=\dfrac{8a-3x}{2}$

$10a-3x-6=8a-3x$

$2a=6 \Rightarrow a=3$

Yanıt / Answer B

---

8. $y=\dfrac{2x+1}{x-1} \Rightarrow f^{-1}(x)=\dfrac{x+1}{x-2}$

$x-2\neq0$

$x\neq2 \Rightarrow a=2$

Yanıt / Answer E

9. $f(2x+1) = 2mx + 2$

$f^{-1}(4) = 3 \Rightarrow f(3) = 4$

$\Rightarrow 2x + 1 = 3$

$2x = 2 \Rightarrow x = 1$

$2m \cdot 1 + 2 = 4$

$2m = 2 \Rightarrow m = 1$

Yanıt / Answer A

10. $f(3x-1) = mx - 5$

$f^{-1}(3) = -7 \Rightarrow f(-7) = 3$

$3x - 1 = -7$

$3x = -6 \Rightarrow x = -2$

$\Rightarrow mx - 5 = 3$

$-2m - 5 = 3$

$-2m = 8 \Rightarrow m = -4$

Yanıt / Answer C

11. $f(2x^2 - 5x) = 4x^2 - 10x + 3$

$f(2x^2 - 5x) = 2(2x^2 - 5x) + 3$

$2x^2 - 5 = t$

$f(t) = 2t + 3$

$f(3) = 2 \cdot 3 + 3 = 9$

$f^{-1}(7) = a \Rightarrow f(a) = 7$

$\Rightarrow 2a + 3 = 7 \Rightarrow a = 2$

$f(3) - f^{-1}(7) = 9 - 2 = 7$

Yanıt / Answer C

12. $f(x) = \dfrac{ax+1}{3x+4} \Rightarrow f^{-1}(x) = \dfrac{1-4x}{3x-a}$

$f(x) = f^{-1}(x) \Rightarrow \dfrac{ax+1}{3x+4} = \dfrac{1-4x}{3x-a}$

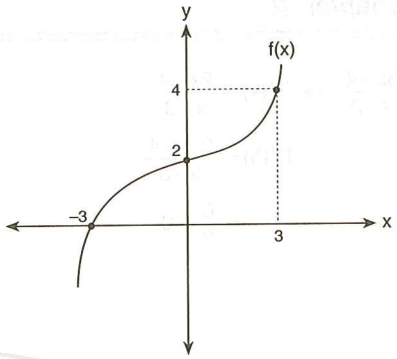
$\Rightarrow a = -4$

$f(x) = \dfrac{-4x+1}{3x+4}$

$f(-1) = \dfrac{(-4)\cdot(-1)+1}{3(-1)+4} = 5$

Yanıt / Answer E

13.



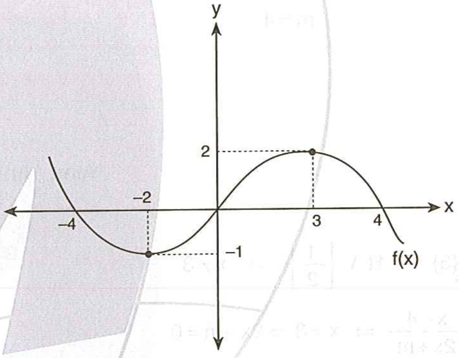
$f(0) = 2 \quad \Rightarrow f^{-1}(2) = 0$

$f(3) = 4 \quad \Rightarrow f^{-1}(4) = 3$

$\Rightarrow f^{-1}(2) + f^{-1}(4) = 0 + 3 = 3$

Yanıt / Answer D

14.



$f(-2) = -1 \quad \Rightarrow f^{-1}(-1) = -2$

$f(3) = 2 \Rightarrow f^{-1}(2) = 3$

$f(0) = 0$

$f^{-1}(-1) + f^{-1}(2) - f(0) = -2 + 3 - 0 = 1$

Yanıt / Answer B

15. $f(x) = 3^x + 1 \Rightarrow f(x-1) = 3^{x-1} + 1$

$3^x = f(x) - 1 \Rightarrow f(x-1) = \dfrac{f(x)-1}{3} + 1$

$= \dfrac{f(x)+2}{3}$

Yanıt / Answer D

1. $$\left.\begin{array}{l} f(x)=3x^2-1\\ g(x)=3x+2 \end{array}\right\} \Rightarrow \mathbf{g^{-1}of(-2)=?}$$

A) 3 B) 4 C) 5 D) 6 E) 9

2. $$\left.\begin{array}{l} f(x)=3x+1\\ g(x)=\dfrac{2x+12}{3} \end{array}\right\} \Rightarrow \mathbf{fog(12)=?}$$

A) 35 B) 37 C) 42 D) 45 E) 48

3. $$\left.\begin{array}{l} f(x)=2x+4\\ g(x)=2x+6 \end{array}\right\} \Rightarrow \mathbf{gof^{-1}(3)=?}$$

A) 1 B) 2 C) 3 D) 4 E) 5

4. $$\left.\begin{array}{l} f(x)=3x+5\\ fog(x)=6x+2 \end{array}\right\} \Rightarrow \mathbf{g(x)=?}$$

A) 3x – 2 B) 3x – 1 C) 3x + 1 D) 2x + 1 E) 2x – 1

5. $$\left.\begin{array}{l} f(x)=2x+3\\ gof(x)=2x-3 \end{array}\right\} \Rightarrow \mathbf{g(x)=?}$$

A) x – 2 B) x – 3 C) x – 5 D) x – 6 E) x – 8

6. $$\left.\begin{array}{l} f(x)=\dfrac{x-a}{2-x}\\ fof(x)=\dfrac{5x-12}{-3x+8} \end{array}\right\} \Rightarrow \mathbf{a=?}$$

A) –3 B) –2 C) 1 D) 3 E) 4

7. $$\left.\begin{array}{l} f(x)=3x+9\\ gof(x)=6x-5 \end{array}\right\} \Rightarrow \mathbf{g(12)=?}$$

A) 1 B) 3 C) 5 D) 7 E) 8

8. $$\left.\begin{array}{l} f(x+1)=3x^2-x+1\\ g^{-1}(x)=\dfrac{x+1}{2x} \end{array}\right\} \Rightarrow \mathbf{fog(1)=?}$$

A) –2 B) –1 C) 0 D) 1 E) 2

9. $\left.\begin{array}{l} f(x)=4x-3 \\ g(x)=\dfrac{4mx+3}{4} \\ f\circ g(x)=I(x) \end{array}\right\} \Rightarrow$ **m = ?**

A) $-\dfrac{1}{2}$ B) $\dfrac{1}{2}$ C) $\dfrac{1}{3}$ D) $\dfrac{1}{4}$ E) $\dfrac{1}{5}$

10. $\left.\begin{array}{l} f(x)=\dfrac{x-3}{2} \\ g\circ f(x)=5x-1 \end{array}\right\} \Rightarrow$ $\mathbf{g^{-1}(-6)=?}$

A) –3 B) –2 C) –1 D) 1 E) 2

11. $\left.\begin{array}{l} A=\{1,2,3,4\} \\ f=\begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 1 & 2 & 3 \end{pmatrix} \end{array}\right\} \Rightarrow$ $\mathbf{f^{-1}=?}$

A) $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 3 & 4 & 1 \end{pmatrix}$ B) $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 3 & 4 & 2 & 1 \end{pmatrix}$

C) $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 3 & 2 & 1 \end{pmatrix}$ D) $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 1 & 4 & 3 & 2 \end{pmatrix}$

E) $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 2 & 3 & 1 \end{pmatrix}$

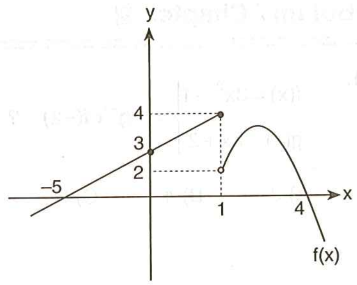
12. $\left.\begin{array}{l} A=\{a,b,c,d\} \\ f=\begin{pmatrix} a & b & c & d \\ b & a & d & c \end{pmatrix} \\ f\circ g=\begin{pmatrix} a & b & c & d \\ c & d & b & a \end{pmatrix} \end{array}\right\} \Rightarrow$ **g = ?**

A) $\begin{pmatrix} a & b & c & d \\ d & c & a & b \end{pmatrix}$ B) $\begin{pmatrix} a & b & c & d \\ b & c & d & a \end{pmatrix}$

C) $\begin{pmatrix} a & b & c & d \\ c & a & b & d \end{pmatrix}$ D) $\begin{pmatrix} a & b & c & d \\ b & d & a & c \end{pmatrix}$

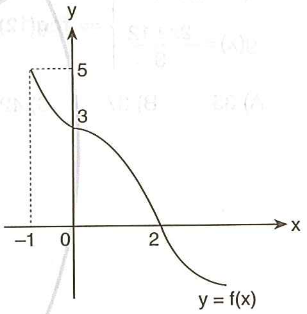
E) $\begin{pmatrix} a & b & c & d \\ d & a & b & c \end{pmatrix}$

13. **fofof(1) = ?**



A) 1 B) 2 C) 3 D) 4 E) –5

14. $\dfrac{\mathbf{f^{-1}(3)+f(-1)}}{\mathbf{f^{-1}(5)+f(2)}}$ **= ?**

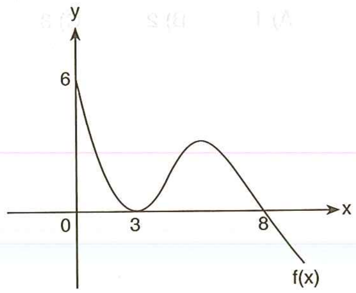


A) –5 B) –3 C) 1 D) 3 E) 5

15. $g(x-3)=x^2-2x+m$

$f^{-1}og(1)=0$

$\Rightarrow$ **m = ?**



A) –4 B) –3 C) –2 D) 2 E) 4

Yanıtlar / Answers

1. A	4. E	7. A	10. B	13. C
2. B	5. D	8. D	11. A	14. A
3. E	6. E	9. D	12. A	15. C

1. $f(x) = 3x^2 - 1$

$g(x) = 3x + 2$

$g^{-1}of(-2) = g^{-1}(f(-2)) = g^{-1}(3\cdot(-2)^2 - 1)$

$= g^{-1}(11) = a$

$\Rightarrow g(a) = 11$

$3a + 2 = 11$

$3a = 9 \ \Rightarrow \ a = 3$

$\Rightarrow \ g^{-1}of\,(-2) = 3$

Yanıt / Answer A

2. $f(x) = 3x + 1$

$g(x) = \dfrac{2x+12}{3}$

$fog(12) = f(g(12)) = f\left(\dfrac{2\cdot 12+12}{3}\right) = f(12)$

$= 3\cdot 12 + 1 = 37$

Yanıt / Answer B

3. $gof^{-1}(3) = g\left(f^{-1}(3)\right)$

$f^{-1}(3) = a \ \Rightarrow \ f(a) = 3$

$2a + 4 = 3$

$2a = -1$

$a = -\dfrac{1}{2} \ \Rightarrow \ f^{-1}(3) = -\dfrac{1}{2}$

$g\left(f^{-1}(3)\right) = g\left(-\dfrac{1}{2}\right) = 2\cdot\left(-\dfrac{1}{2}\right) + 6 = 5$

Yanıt / Answer E

4. $f(x) = 3x + 5$

$fog(x) = 6x + 2$

$f(g(x)) = 6x + 2$

$\Rightarrow \ 3(g(x)) + 5 = 6x + 2$

$3g(x) = 6x - 3$

$g(x) = \dfrac{6x-3}{3} \ \Rightarrow \ g(x) = 2x - 1$

Yanıt / Answer E

5. $gof(x) = 2x - 3$

$g(2x+3) = 2x - 3$

$\Rightarrow \ g(x) = 2\left(\dfrac{x-3}{2}\right) - 3$

$= x - 3 - 3 = x - 6$

Yanıt / Answer D

6. $f(x) = \dfrac{x-a}{2-x}$

$fof(x) = \dfrac{\dfrac{x-a}{2-x} - a}{2 - \dfrac{x-a}{2-x}} = \dfrac{x(a+1) - 3a}{4 + a - 3x} = \dfrac{5x - 12}{-3x + 8}$

$a + 1 = 5 \ \Rightarrow \ a = 4$

Yanıt / Answer E

7. $f(x) = 3x + 9$

$gof(x) = g(\underbrace{f(x)}_{12}) = 6x - 5$

$f(x) = 12 = 3x + 9 \ \Rightarrow x = 1$

$g(12) = 6\cdot 1 - 5 = 1$

Yanıt / Answer A

8. $f(x+1) = 3x^2 - x + 1$

$g^{-1}(x) = \dfrac{x+1}{2x} \ \Rightarrow \ g\left(\dfrac{x+1}{2x}\right) = x$

$\dfrac{x+1}{2x} = 1$

$x + 1 = 2x \ \Rightarrow \ x = 1$

$\Rightarrow \ fog(1) = f(g(1)) = f(1) = 1$

Yanıt / Answer D

9. $f(x) = 4x - 3 \qquad g(x) = \dfrac{4mx+3}{4}$

$$fog(x) = I(x) \Rightarrow f^{-1}(x) = g(x)$$

$$\frac{x+3}{4} = \frac{4mx+3}{4}$$

$$4m = 1$$

$$m = \frac{1}{4}$$

Yanıt / Answer D

10. $gof(x) = 5x - 1$

$$g\left(\frac{x-3}{2}\right) = 5x - 1$$

$$g^{-1}(5x-1) = \frac{x-3}{2}$$

$$5x - 1 = -6$$

$$x = -1$$

$$g^{-1}(-6) = \frac{-1-3}{2}$$

$$= -\frac{4}{2} = -2$$

Yanıt / Answer B

11. $f = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 1 & 2 & 3 \end{pmatrix} \Rightarrow f^{-1} = \begin{pmatrix} 4 & 1 & 2 & 3 \\ 1 & 2 & 3 & 4 \end{pmatrix}$

$$= \begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 3 & 4 & 1 \end{pmatrix}$$

Yanıt / Answer A

12. $fog = \begin{pmatrix} a & b & c & d \\ c & d & b & a \end{pmatrix}$

$$\begin{pmatrix} a & b & c & d \\ b & a & d & c \end{pmatrix} o\, g = \begin{pmatrix} a & b & c & d \\ c & d & b & a \end{pmatrix}$$

$$g = \begin{pmatrix} a & b & c & d \\ d & c & a & b \end{pmatrix}$$

Yanıt / Answer A

13. $fofof(1) = fof(f(1))$

$$= fof(4)$$

$$= f(f(4)) = f(0) = 3$$

Yanıt / Answer C

14. $f(0) = 3 \Rightarrow f^{-1}(3) = 0$

$$f(-1) = 5 \Rightarrow f^{-1}(5) = -1$$

$$f(2) = 0$$

$$\frac{f^{-1}(3) + f(-1)}{f^{-1}(5) + f(2)} = \frac{0+5}{-1+0} = -5$$

Yanıt / Answer A

15. $g(x-3) = x^2 - 2x + m$

$$f^{-1}og(1) = 0$$

$$f^{-1}(g(1)) = 0$$

$$\Rightarrow f(0) = g(1)$$

$$6 = g(1)$$

$$\Rightarrow g(4-3) = 4^2 - 2 \cdot 4 + m$$

$$g(1) = 16 - 8 + m$$

$$6 = 8 + m \Rightarrow m = -2$$

Yanıt / Answer C

İŞLEM ve MODÜLER ARİTMETİK
OPERATION and MODULAR ARITHMETICS

BÖLÜM
CHAPTER
3

İşlem / Operation

Test 1

1. $x \Delta y = 2^x + 3^y \Rightarrow$ **$-1 \Delta 2 = ?$**

A) $\frac{17}{2}$ B) $\frac{19}{2}$ C) $\frac{21}{2}$ D) $\frac{23}{2}$ E) $\frac{25}{2}$

2. $x \square y = x^y + y^x \Rightarrow$ **$2 \square 3 = ?$**

A) 17 B) 19 C) 21 D) 23 E) 25

3. $\left.\begin{array}{l} x\Delta y = 3x + y \\ (3\Delta 2a)\Delta 3 = 54 \end{array}\right\} \Rightarrow \mathbf{a = ?}$

A) 1 B) 2 C) 3 D) 4 E) 5

4. $\left.\begin{array}{l} x\Delta y = x + y^2 \\ a\square b = \dfrac{a\Delta b}{2} - 1 \end{array}\right\} \Rightarrow \mathbf{3\square 5 = ?}$

A) 11 B) 12 C) 13 D) 14 E) 15

5. $\left.\begin{array}{l} x\square y = x^y \\ x\Delta y = 2x - 4y \end{array}\right\} \Rightarrow \mathbf{(3\square 2)\Delta(2\square 1) = ?}$

A) 5 B) 6 C) 7 D) 9 E) 10

6. $\left.\begin{array}{l} x\Delta y = 2x - y \\ (2\Delta a)\Delta 4 = 0 \end{array}\right\} \Rightarrow \mathbf{a = ?}$

A) −2 B) −1 C) 0 D) 1 E) 2

7. $\left.\begin{array}{l} x\Delta y = x + y - 2 \\ x\square y = 2x - y + 1 \\ (2\square a)\Delta(3\Delta 4) = 2 \end{array}\right\} \Rightarrow \mathbf{a = ?}$

A) 6 B) 7 C) 8 D) 9 E) 10

8. $\left.\begin{array}{l} x\square y = 3x - 2y \\ x\Delta y = x^2 - 2xy \\ a\square(2\Delta 3) = 1 \end{array}\right\} \Rightarrow \mathbf{a = ?}$

A) −6 B) −5 C) −3 D) 5 E) 6

9. $$x\Delta y = \begin{cases} x+y, & x<y \\ x^2+y, & x=y \\ 2x-y, & x>y \end{cases} \Rightarrow \mathbf{(-2\Delta-2)\Delta(5\Delta 2) = ?}$$

A) 2 B) 4 C) 6 D) 8 E) 10

10. $$\left.\begin{aligned} x\,\square\,y &= x^3+y^3 \\ x\Delta y &= xy \\ (a\Delta 2)\square\,3 &= 91 \end{aligned}\right\} \Rightarrow \mathbf{a = ?}$$

A) 1 B) 2 C) 3 D) 4 E) 5

11.

Δ	1	2	3	4	5
1	3	4	5	1	2
2	4	5	1	2	3
3	5	1	2	3	4
4	1	2	3	4	5
5	2	3	4	5	1

$\Rightarrow$ **(2 Δ 3) Δ (2 Δ 5) = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

12. $x^{x\Delta y} = 9^{x+y} \Rightarrow$ **3Δ2 = ?**

A) 8 B) 9 C) 10 D) 12 E) 14

13. $x\,\Delta\,y = 2x - 3y + 1 \Rightarrow$ **2 Δ [3 Δ (–1)] = ?**

A) –25 B) –18 C) –15 D) 15 E) 25

14. $$\left.\begin{aligned} x\Delta y &= x-y+2 \\ x\square y &= \frac{1}{x}+\frac{1}{y} \\ (2\square 3)\square(4\Delta a) &= 1 \end{aligned}\right\} \Rightarrow \mathbf{a = ?}$$

A) 8 B) 9 C) 10 D) 11 E) 13

15. $$\left.\begin{aligned} x\square y &= 2x-y \\ m\square n &= -9 \\ n\square m &= 12 \end{aligned}\right\} \Rightarrow \mathbf{m\cdot n = ?}$$

A) –12 B) –10 C) –8 D) 10 E) 11

16. $m \bullet n = (m+n)^2 - (m-n)^2$

$\Rightarrow$ **$(\sqrt{2} \bullet (\sqrt{2} \bullet (\sqrt{2} \bullet \sqrt{2}))) = ?$**

A) 2^3 B) 12 C) 16

D) 2^8 E) 512

[YTÜ. YÖS 2013]

Yanıtlar / Answers

1. B	4. C	7. A	10. B	13. A	16. D
2. A	5. E	8. B	11. E	14. D	
3. D	6. E	9. E	12. C	15. B	

1. $x\Delta y=2^{x}+3^{y}$

$-1\Delta 2=2^{-1}+3^{2}$

$=\frac{1}{2}+9=\frac{19}{2}$

Yanıt / Answer B

---

2. $x\square y=x^{y}+y^{x}$

$2\square 3=2^{3}+3^{2}=17$

Yanıt / Answer A

---

3. $x\Delta y=3x+y \Rightarrow 3\Delta 2a=3\cdot 3+2a=9+2a$

$(3\Delta 2a)\Delta 3=54$

$3(9+2a)+3=54$

$27+6a+3=54$

$6a=24$

$a=4$

Yanıt / Answer D

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4. $x\Delta y=x+y^{2}$

$a\square b=\frac{a\Delta b}{2}-1$

$3\square 5=\frac{3\Delta 5}{2}-1$

$=\frac{3+5^{2}}{2}-1=13$

Yanıt / Answer C

---

5. $x\square y=x^{y}$, $x\Delta y=2x-4y$

$(3\square 2)\Delta(2\square 1)=3^{2}\Delta 2^{1}$

$=9\Delta 2$

$=2\cdot 9-4\cdot 2=10$

Yanıt / Answer E

---

6. $x\Delta y=2x-y \Rightarrow 2\Delta a=2\cdot 2-a=4-a$

$(2\Delta a)\Delta 4=0$

$(4-a)\Delta 4=0$

$2(4-a)-4=0$

$8-2a-4=0 \Rightarrow a=2$

Yanıt / Answer E

---

7. $x\Delta y=x+y-2$ $\qquad x\square y=2x-y+1$

$(2\square a)\Delta(3\Delta 4)=2$

$(2\cdot 2-a+1)\Delta(3+4-2)=2$

$(5-a)\Delta(5)=2$

$5-a+5-2=2$

$a=6$

Yanıt / Answer A

---

8. $x\Delta y=x^{2}-2xy \Rightarrow 2\Delta 3=2^{2}-2\cdot 2\cdot 3=4-12=-8$

$a\square(2\Delta 3)=1$

$3a-2(2\Delta 3)=1$

$3a-2(-8)=1$

$3a+16=1$

$3a=-15 \Rightarrow a=-5$

Yanıt / Answer B

9. $-2 = -2 \Rightarrow -2 \Delta -2 = (-2)^2 + (-2) = 2$

$5 > 2 \Rightarrow 5 \Delta 2 = 2 \cdot 5 - 2 = 8$

$(-2 \Delta -2) \Delta (5 \Delta 2) = 2 \Delta 8$

$2 < 8 \Rightarrow 2 \Delta 8 = 2 + 8 = 10$

Yanıt / Answer E

---

10. $(a \Delta 2) \square 3 = 91$

$2a \square 3 = 91$

$(2a)^3 + 3^3 = 91$

$8a^3 + 27 = 91$

$8a^3 = 64$

$a^3 = 8 \Rightarrow a = 2$

Yanıt / Answer B

---

11. $(2 \Delta 3) \Delta (2 \Delta 5) = 1 \Delta 3$

$= 5$

Yanıt / Answer E

---

12. $x^{x \Delta y} = 9^{x+y}$

$x = 3,\ y = 2 \Rightarrow 3^{3 \Delta 2} = 9^{3+2}$

$3^{3 \Delta 2} = 9^5 = 3^{10}$

$3 \Delta 2 = 10$

Yanıt / Answer C

---

13. $2 \Delta [3 \Delta (-1)]$

$= 2 \Delta (2 \cdot 3 - 3(-1) + 1)$

$= 2 \Delta 10$

$= 2 \cdot 2 - 3 \cdot 10 + 1 = -25$

Yanıt / Answer A

---

14. $(2 \square 3) \square (4 \Delta a) = 1$

$$\left(\frac{1}{2} + \frac{1}{3}\right) \square (4 - a + 2) = 1$$

$$\left[\frac{5}{6} \square (6 - a)\right] = 1$$

$$\frac{1}{\frac{5}{6}} + \frac{1}{6-a} = 1$$

$$\frac{6}{5} + \frac{1}{6-a} = 1$$

$$\frac{1}{6-a} = \frac{-1}{5} \Rightarrow a = 11$$

Yanıt / Answer D

---

15. $m \square n = -9 \Rightarrow 2m - n = -9$

$n \square m = 12 \Rightarrow 2/\ 2n - m = 12$

$2m - n = -9$

$+\ 4n - 2m = 24$

$3n = 15 \Rightarrow n = 5$

$2m - 5 = -9 \Rightarrow 2m = -4 \Rightarrow m = -2$

$m \cdot n = (-2) \cdot 5 = -10$

Yanıt / Answer B

---

16. $(\sqrt{2} \bullet \sqrt{2}) = (\sqrt{2} + \sqrt{2})^2 - (\sqrt{2} - \sqrt{2})^2 = 8$

$(\sqrt{2} \bullet (\sqrt{2} \bullet (\sqrt{2} \bullet \sqrt{2}))) = (\sqrt{2} \bullet \sqrt{2})^2 \bullet (\sqrt{2} \bullet \sqrt{2})$

$= 8 \bullet 8$

$= (8 + 8)^2 - (8 - 8)^2$

$= 16^2$

$= 2^8$

Yanıt / Answer D

1. $1915 \equiv x \pmod 7$

$1917 \equiv y \pmod 5$

$\Rightarrow$ **$x + y = ?$**

A) 4 B) 5 C) 6

D) 7 E) 8

2. $Z_{/5}$

$\Rightarrow \overline{3}^2 \cdot \overline{2} + \overline{2}^2 \cdot \overline{3} + \overline{2} \cdot \overline{3} = ?$

A) $\overline{1}$ B) $\overline{2}$ C) $\overline{3}$

D) $\overline{4}$ E) $\overline{0}$

3. $Z_{/8}$

$\Rightarrow \dfrac{x^2 - \overline{17}}{x - \overline{3}} = ?$

A) $x + \overline{1}$ B) $x + \overline{2}$ C) $x + \overline{3}$

D) $x + \overline{4}$ E) $x + \overline{5}$

4. $Z_{/6}$,

$f(x) = \overline{4}x + \overline{6} \Rightarrow$ **$f(\overline{5}) = ?$**

A) $\overline{2}$ B) $\overline{4}$ C) $\overline{5}$

D) $\overline{3}$ E) $\overline{1}$

5.

$$f(x) = \begin{cases} 2x+1 & , \quad x \equiv 0 \pmod 5 \\ x+1 & , \quad x \equiv 1 \pmod 5 \\ 2x-1 & , \quad x \equiv 3 \pmod 5 \end{cases}$$

$\Rightarrow$ **$f(5) + f(6) + f(8) = ?$**

A) 30 B) 27 C) 33

D) 41 E) 16

6. $1! + 2! + 3! + \ldots + 47! \equiv x \pmod 5$

$\Rightarrow$ **$x = ?$**

A) 0 B) 1 C) 2

D) 3 E) 4

7. $x \in Z^+$,

$32 \equiv 4 \pmod{x} \Rightarrow$ **$\sum x = ?$**

A) 48 B) 28 C) 56

D) 42 E) 84

8. $(-15)^{21} \equiv x \pmod 8 \Rightarrow$ **$x = ?$**

A) 7 B) 1 C) 6

D) 2 E) 4

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9. $x \in Z^+$,

$x \equiv 4 \pmod 5 \Rightarrow$ **min(x) = ?**

A) 9
B) 5
C) 14
D) 4
E) 1

10. $x \in Z^-$,

$-21 \equiv x \pmod 8 \Rightarrow$ **max(x) = ?**

A) –5
B) –3
C) –8
D) –1
E) –21

11. $Z_{/7}$,

$$\Rightarrow \left(\frac{\bar{1}}{\bar{2}}\right)^2 + \left(\frac{\bar{3}}{\bar{5}}\right) + \bar{2} = ?$$

A) 1
B) 2
C) 3
D) 5
E) 6

12. $(1992)^{1992} \equiv x \pmod 5 \Rightarrow$ **x = ?**

A) 1
B) 2
C) 3
D) 4
E) 0

13. $(2002)^{1982} \equiv x \pmod{10} \Rightarrow$ **x = ?**

A) 1
B) 4
C) 6
D) 8
E) 9

14. $4^{27} \equiv x \pmod{16} \Rightarrow$ **x = ?**

A) 10
B) 8
C) 5
D) 2
E) 0

15. $(2003)^{12k+2} \equiv x \pmod 5 \Rightarrow$ **x = ?**

A) 4
B) 0
C) 1
D) 2
E) 3

16. $n \in N$ (N is set of natural numbers)

$\mathbf{6^{2n+4} + 2^{3n+2} + 6 \equiv ? \pmod 7}$

A) 2
B) 3
C) 4
D) 5
E) 6

[AKDENİZ ÜNV. YÖS 2013]

Yanıtlar / Answers

1. C	4. A	7. C	10. A	13. B	16. C
2. A	5. C	8. B	11. E	14. E	
3. C	6. D	9. D	12. A	15. A	

1.

$$\begin{array}{r|l} 1915 & 7 \\ \cline{2-2} - & 273 \\ \hline 4 & \end{array} \qquad \begin{array}{r|l} 1917 & 5 \\ \cline{2-2} - & 383 \\ \hline 2 & \end{array}$$

$1915 \equiv 4 \pmod 7$ $\quad$ $1917 \equiv 2 \pmod 5$

$\Rightarrow x + y = 4 + 2 = 6$

Yanıt / Answer C

2. $\overline{3}^2 \cdot \overline{2} + \overline{2}^2 \cdot \overline{3} + \overline{2} \cdot \overline{3} = 36$

$36 \equiv 1 \pmod 5$

$$\begin{array}{r|l} 36 & 5 \\ \cline{2-2} 35 & 7 \\ \hline 1 & \end{array}$$

Yanıt / Answer A

3. $\dfrac{x^2 - \overline{17}}{x - \overline{3}} = \dfrac{x^2 - \overline{9}}{x - \overline{3}}$ $\quad$ $[17 \equiv 9 \pmod 8]$

$= \dfrac{(x - \overline{3})(x + \overline{3})}{(x - \overline{3})}$

$= x + \overline{3}$

Yanıt / Answer C

4. $f(x) = \overline{4}x + \overline{6}$

$f(5) = 4 \cdot 5 + 6$

$= 26$

$26 \equiv 2 \pmod 6$

$$\begin{array}{r|l} 26 & 6 \\ \cline{2-2} - & 4 \\ \hline ② & \end{array}$$

Yanıt / Answer A

5. $5 \equiv 0 \pmod 5 \Rightarrow f(5) = 2 \cdot 5 + 1 = 11$

$6 \equiv 1 \pmod 5 \Rightarrow f(6) = 6 + 1 = 7$

$8 \equiv 3 \pmod 5 \Rightarrow f(8) = 2 \cdot 8 - 1 = 15$

$\Rightarrow f(5) + f(6) + f(8) = 33$

Yanıt / Answer C

6.

$1! = 1 \qquad 1 \equiv 1 \pmod 5$

$2! = 2 \qquad 2 \equiv 2 \pmod 5$

$3! = 6 \qquad 6 \equiv 1 \pmod 5$

$4! = 24 \qquad 24 \equiv 1 \pmod 5$

$5! = 120 \qquad 120 \equiv 0 \pmod 5$

$\vdots \qquad \vdots$

$\Rightarrow 1 + 2 + 1 + 4 \equiv 3 \pmod 5$

Yanıt / Answer D

7. $32 \equiv 4 \pmod x$

$\Rightarrow 32 - 4 \equiv 4 - 4 \pmod x$

$28 \equiv 0 \pmod x$

$\Rightarrow 1 + 2 + 4 + 7 + 14 + 28 = 56$

Yanıt / Answer C

8. $(-15)^{21} \equiv x \pmod 8$

$\Rightarrow (1)^{21} \equiv x \pmod 8$ $\quad$ $[-15 \equiv 1 \pmod 8]$

$(1)^{21} \equiv 1 \pmod 8$

$x = 1$

Yanıt / Answer B

9. $x \equiv 4 \pmod 5$

$\Rightarrow \bar{5} = \{\ldots, -6, -1, 4, 9, 13 \ldots\}$

$x \in Z^{+} \Rightarrow \min(x) = 4$

Yanıt / Answer D

10. $-21 \equiv x \pmod 8$

$3 \equiv x \pmod 8$

$\bar{5} = \{\ldots, -13, -5, 3, 11 \ldots\}$

$\Rightarrow \max(x) = -5$

Yanıt / Answer A

11.
$$\left(\frac{\bar{1}}{\bar{2}}\right)^2 + \left(\frac{\bar{3}}{\bar{5}}\right) + \bar{2} = 4^2 + 2 + 2 \quad [\,\bar{1} \equiv \bar{8},\ \bar{3} \equiv \overline{10} \pmod 7\,]$$
$$= 20$$
$$= 6 \quad [\,20 \equiv 6 \pmod 7\,]$$

Yanıt / Answer E

12. $(1992)^1 \equiv 2 \pmod 5$

$(1992)^2 \equiv 4 \pmod 5$

$(1992)^3 \equiv 3 \pmod 5$

$(1992)^4 \equiv 1 \pmod 5$

$$\begin{array}{r|l} 1992 & 4 \\ \cline{2-2} - \quad & 498 \\ \cline{1-1} \end{array}$$

⓪ → Kalan / Remainder

$(1992)^{1992} \equiv x \pmod 5 \Rightarrow x = 1$

Yanıt / Answer A

13. $(2002)^1 \equiv 2 \pmod{10}$

$(2002)^2 \equiv 4 \pmod{10}$

$(2002)^3 \equiv 8 \pmod{10}$

$(2002)^4 \equiv 6 \pmod{10}$

$(2002)^5 \equiv 2 \pmod{10}$

$\vdots \qquad\qquad \vdots$

$(2002)^{1982} \equiv x \pmod{10} \Rightarrow x = 4$

$$\begin{array}{r|l} 1982 & 4 \\ \cline{2-2} - \quad & 495 \\ \cline{1-1} \end{array}$$

❷ → Kalan / Remainder

Yanıt / Answer B

14. $4^1 \equiv 4 \pmod{16}$

$4^2 \equiv 0 \pmod{16}$

$4^3 \equiv 0 \pmod{16}$

$\vdots \qquad\qquad \vdots$

$\Rightarrow 4^{27} \equiv 0 \pmod{16}$

Yanıt / Answer E

15. $(2003)^1 \equiv 3 \pmod 5$

$(2003)^2 \equiv 4 \pmod 5$

$(2003)^3 \equiv 2 \pmod 5$

$(2003)^4 \equiv 1 \pmod 5$

$\vdots \qquad\qquad \vdots$

$(2003)^2 \equiv x \pmod 5 \Rightarrow x = 4$

$$\begin{array}{r|l} 12k+2 & 4 \\ \cline{2-2} - \quad & \\ \cline{1-1} \end{array}$$

❷ → Kalan / Remainder

Yanıt / Answer A

16. $6^1 \equiv 6$

$6^2 \equiv 1 \pmod 7$

$2^1 \equiv 2$

$2^2 \equiv 4$

$2^3 \equiv 1 \pmod 7$

$1 + 1 \cdot 4 + (-1) \equiv 4 \pmod 7$

Yanıt / Answer C

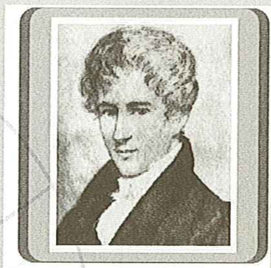
ÜNİTE

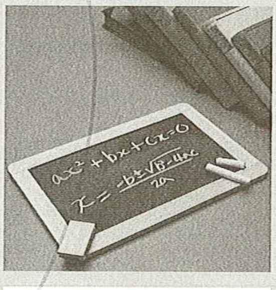
UNIT 6

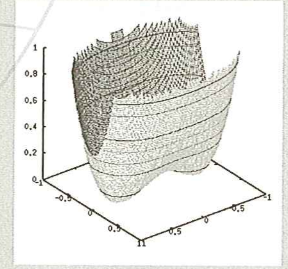
Abel, Niels Henrik [1802-1829]

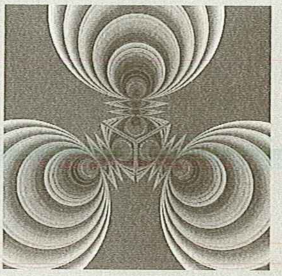
Norveçli matematikçi 19 yaşında dörtten büyük dereceli denklemlerin çözülemeyeceğini göstermiştir. Başka bir deyişle, bu denklemlerin ikinci dereceden denklemler gibi formulünün olmadığını kanıtmalıştır. Aynı zamada cebirsel fonksiyonlar teorisindeki temel gelişmeleri yanıtlamıştır.

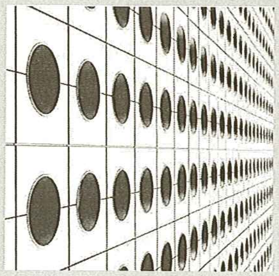
Norwegian mathematician who at the age of 19, proved that the general equation of degree greater than 4 cannot be solved algebraically. In other words, there can be no formula for the roots of such an equation similar to the familiar formula for the quadratic equation. He was also responsible for fundamental developments in theory of algebraic function











- ✓ **POLİNOMLAR** .... **205 – 224**
- ✓ **İKİNCİ DERECEDEN DENKLEMLER** .... **225 – 236**
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Polinomlar / Polynomials

Test 1

1. $\left.\begin{array}{l} P(x)=x^{2-n}+3x^2-5 \\ \text{der}[P(x)]=5 \end{array}\right\} \Rightarrow \mathbf{n=?}$

A) –3 B) –2 C) 2 D) 3 E) 7

2. $\left.\begin{array}{l} P(x)=(3a-6)x^4-2x^3+x-3 \\ \text{der}[P(x)]=3 \end{array}\right\} \Rightarrow \mathbf{a=?}$

A) –2 B) –1 C) 0 D) 1 E) 2

3. $\left.\begin{array}{l} P(x)=(a-2)x^3+(b+3)x-5 \\ P(x)=-5 \end{array}\right\} \Rightarrow \mathbf{a+b=?}$

A) –2 B) –1 C) 0 D) 1 E) 2

4. $\left.\begin{array}{l} P(x)=(a+3)x^5+(b-1)x^2+c+2 \\ P(x)=0 \end{array}\right\} \Rightarrow \mathbf{a \cdot b \cdot c=?}$

A) –6 B) –4 C) 0 D) 4 E) 6

5. $P(x) = 6x^4 - 5x^2 + 3x - 1 \Rightarrow \mathbf{P(-1) = ?}$

A) –5 B) –3 C) 0 D) 3 E) 5

6. $P(x) = x^3 - 3x - 5 \Rightarrow \mathbf{P(-2) = ?}$

A) –7 B) –5 C) –3 D) 5 E) 7

7. $P(x) = 8x^3 - 6x^2 - 3x + 5 \Rightarrow \mathbf{P\left(-\frac{1}{2}\right) = ?}$

A) –4 B) –3 C) 0 D) 3 E) 4

8. $P(x) = 3x^3 - 2x^2 - x + 1 \Rightarrow \mathbf{P(2) = ?}$

A) 8 B) 10 C) 12 D) 15 E) 18

9. $\left.\begin{array}{l} P(x) = 2x^3 + (a+1)x^2 - 3x + 4 \\ P(1) = 0 \end{array}\right\} \Rightarrow \mathbf{a = ?}$

A) –4 B) –3 C) 1 D) 3 E) 4

10. $\left.\begin{array}{l} P(x) = 8x^3 + ax^2 - 3 \\ P(-1) = -15 \end{array}\right\} \Rightarrow \mathbf{a = ?}$

A) –6 B) –5 C) –4 D) –3 E) –2

11. $P(x) = (2x^2 - 3x + 1)^3 \Rightarrow \mathbf{P(2) = ?}$

A) 8 B) 12 C) 16 D) 18 E) 27

12. $P(x) = -7x^4 - 8x^3 + 5x^2 - 12x + 11 \Rightarrow \mathbf{P(-1) = ?}$

A) 17 B) 19 C) 27 D) 29 E) 31

13. $\left.\begin{array}{l} P(x) = 4x^3 - 2x^2 + ax + 5 \\ P(2) = 35 \end{array}\right\} \Rightarrow \mathbf{a = ?}$

A) 1 B) 2 C) 3 D) 4 E) 5

14. $P(3x+1) = x^2 - 3x - 2 \Rightarrow \mathbf{P(-2) = ?}$

A) 2 B) 3 C) 4 D) 6 E) 8

15. $P(2x+3) = 4x^2 - 2x + 7 \Rightarrow \mathbf{P(3) = ?}$

A) 1 B) 3 C) 5 D) 7 E) 9

16. $\begin{array}{r|l} P(x) & x+1 \\ \cline{2-2} \underline{\;-\;\;\;\;\;} & A(x) \\ -6 & \end{array} \qquad \begin{array}{r|l} P(x) & x-2 \\ \cline{2-2} \underline{\;-\;\;\;\;\;} & B(x) \\ 6 & \end{array} \qquad \begin{array}{r|l} P(x) & (x+1)(x-2) \\ \cline{2-2} \underline{\;-\;\;\;\;\;} & C(x) \\ ax+b & \end{array}$

ax + b = ?

A) 4x + 2 B) 4x – 2 C) 2x – 2

D) x – 4 E) 2x + 4

[İSTANBUL ÜNV. YÖS 2013]

Yanıtlar / Answers

1. A	4. E	7. E	10. C	13. C	16. B
2. E	5. B	8. D	11. E	14. A	
3. B	6. A	9. A	12. D	15. D	

1. der[P(x)] = 5 ⇒ $2 - n = 5$

$n = -3$

Yanıt / Answer A

2. der[P(x)] = 3 ⇒ $3a - 6 = 0$

$3a = 6$

$a = 2$

Yanıt / Answer E

3. $P(x) = (a-2)x^3 + (b+3)x - 5$

$P(x) = -5$ ⇒ $a - 2 = 0$ ve (and) $b + 3 = 0$

$a = 2$ $b = -3$

⇒ $a + b = 2 + (-3) = -1$

Yanıt / Answer B

4. $P(x) = (a+3)x^5 + (b-1)x^2 + c + 2$

⇒ $a + 3 = 0$ ve (and) $b - 1 = 0$ ve (and) $c + 2 = 0$

$a = -3$ $b = 1$ $c = -2$

⇒ $a \cdot b \cdot c = (-3) \cdot 1 \cdot (-2) = 6$

Yanıt / Answer E

5. $P(x) = 6x^4 - 5x^2 + 3x - 1$

$x = -1$ ⇒ $P(-1) = 6(-1)^4 - 5(-1)^2 + 3(-1) - 1$

$= 6 - 5 - 3 - 1$

$= -3$

Yanıt / Answer B

6. $P(x) = x^3 - 3x - 5$

$x = -2$ ⇒ $P(-2) = (-2)^3 - 3(-2) - 5$

$= -8 + 6 - 5 = -7$

Yanıt / Answer A

7. $P(x) = 8x^3 - 6x^2 - 3x + 5$

$x = -\frac{1}{2}$

$$\Rightarrow P\left(-\frac{1}{2}\right) = 8\left(-\frac{1}{2}\right)^3 - 6\left(-\frac{1}{2}\right)^2 - 3\left(-\frac{1}{2}\right) + 5$$

$$= -1 - \frac{3}{2} + \frac{3}{2} + 5 = 4$$

Yanıt / Answer E

8. $x = 2$ ⇒ $P(2) = 3 \cdot 2^3 - 2 \cdot 2^2 - 2 + 1$

$= 24 - 8 - 2 + 1 = 15$

Yanıt / Answer D

9. $P(x) = 2x^3 + (a+1)x^2 - 3x + 4$

$x = 1 \Rightarrow P(1) = 2\cdot 1^3 + (a+1)\cdot 1^2 - 3\cdot 1 + 4 = 0$

$2 + a + 1 + 1 = 0$

$a = -4$

Yanıt / Answer A

10. $P(x) = 8x^3 + ax^2 - 3$

$x = -1 \Rightarrow P(-1) = -15 = 8(-1)^3 + a(-1)^2 - 3$

$-15 = -8 + a - 3$

$a = -4$

Yanıt / Answer C

11. $P(x) = (2x^2 - 3x + 1)^3$

$x = 2 \Rightarrow P(2) = (2\cdot 2^2 - 3\cdot 2 + 1)^3$

$= 3^3 = 27$

Yanıt / Answer E

12. $P(x) = -7x^4 - 8x^3 + 5x^2 - 12x + 11$

$x = -1 \Rightarrow$

$P(-1) = -7\cdot(-1)^4 - 8\cdot(-1)^3 + 5(-1)^2 - 12(-1) + 11$

$= 29$

Yanıt / Answer D

13. $x = 2 \Rightarrow P(2) = 4\cdot 2^3 - 2\cdot 2^2 + 2a + 5 = 35$

$32 - 8 + 2a + 5 = 35$

$2a = 6$

$a = 3$

Yanıt / Answer C

14. $P(3x+1) = x^2 - 3x - 2$

$3x + 1 = -2$

$3x = -3$

$x = -1$

$x = -1 \Rightarrow P(3(-1)+1) = (-1)^2 - 3(-1) - 2$

$P(-2) = 1 + 3 - 2 = 2$

Yanıt / Answer A

15. $P(2x+3) = 4x^2 - 2x + 7$

$2x + 3 = 3$

$2x = 0$

$x = 0 \Rightarrow P(2\cdot 0 + 3) = 4\cdot 0^2 - 2\cdot 0 + 7$

$P(3) = 7$

Yanıt / Answer D

16.

$$\begin{array}{r|l} P(x) & x+1 \\ \cline{2-2} & A(x) \\ \hline -6 & \end{array} \Rightarrow P(-1) = -6 \qquad \begin{array}{r|l} P(x) & x-2 \\ \cline{2-2} & B(x) \\ \hline 6 & \end{array} \Rightarrow P(2) = 6$$

$$\begin{array}{r|l} P(x) & (x+1)(x-2) \\ \cline{2-2} & C(x) \\ \hline ax+b & \end{array} \Rightarrow P(x) = (x+1)(x-2)\cdot C(x) + ax + b$$

$x = -1 \Rightarrow -a + b = -6$

$x = 2 \Rightarrow 2a + b = 6$

$a = 4, \quad b = -2$

$\Rightarrow ax + b = 4x - 2$

Yanıt / Answer B

1. $P(2x-1) = 3-4x \Rightarrow \mathbf{P(-3) = ?}$

A) 4 B) 5 C) 6 D) 7 E) 8

2. $P(x-3) = x^3 + 2x^2 - 3x + 5 \Rightarrow \mathbf{P(-2) = ?}$

A) 2 B) 3 C) 4 D) 5 E) 6

3.

$$\left.\begin{array}{l} P(x) = 3x^4 + 7x^3 + ax^2 + a + 1 \\ P(1) = 5 \cdot P(0) \end{array}\right\} \Rightarrow \mathbf{P(-1) = ?}$$

A) 1 B) 2 C) 3 D) 4 E) 5

4. $P(x+4) = x^2 + x - 2 \Rightarrow \mathbf{P(0) \cdot P(1) = ?}$

A) 0 B) 10 C) 24 D) 32 E) 40

5.

$$\left.\begin{array}{l} P(x-3) = x^3 + x^2 + ax - 6 \\ P(-2) = 0 \end{array}\right\} \Rightarrow \mathbf{a = ?}$$

A) 1 B) 2 C) 3 D) 4 E) 5

6. $(x+3) \cdot P(x) = x^3 + ax - 18 \Rightarrow \mathbf{P(2) = ?}$

A) –10 B) –9 C) –8 D) –6 E) –4

7.

$$\left.\begin{array}{l} (2x-1) \cdot P(x+3) = 3 \cdot Q(x) + 2x^2 + 7 \\ P(2) = 9 \end{array}\right\} \Rightarrow \mathbf{Q(-1) = ?}$$

A) –8 B) –9 C) –10 D) –11 E) –12

8.

$$\left.\begin{array}{l} P(x) = (a-2b+3)x^2 + 6 \\ Q(x) = 5x^2 + (b+1)x + c - 5 \\ P(x) = Q(x) \end{array}\right\} \Rightarrow \mathbf{a+b+c = ?}$$

A) 8 B) 9 C) 10 D) 11 E) 12

9. $$\left.\begin{array}{l} P(x)=x^3-6x \\ Q(x)=ax^3+(a+b-2)x^2+(c-1)x \\ P(x)=Q(x) \end{array}\right\} \Rightarrow \mathbf{a+2b+c=?}$$

A) –3 B) –2 C) –1 D) 2 E) 3

10. $$\left.\begin{array}{l} P(x)=(a+b)x^4+3x^3-cx^2+4 \\ Q(x)=\left(\dfrac{a+1}{2}\right)x^3+(b+1)x^2+d \\ P(x)=Q(x) \end{array}\right\} \Rightarrow \mathbf{a+b+c+d=?}$$

A) 8 B) 7 C) 6 D) 5 E) 4

11. $P(x+2)+P(2x+5)=2x-3 \Rightarrow \mathbf{P(-1)=?}$

A) $-\dfrac{11}{2}$ B) $-\dfrac{9}{2}$ C) $-\dfrac{7}{2}$ D) $-\dfrac{5}{2}$ E) $-\dfrac{3}{2}$

12. $$\left.\begin{array}{l} P(x)=(2a-1)x^5-3x^4+2b-5 \\ Q(x)=5x^5-(c+1)x^4-1 \\ P(x)=Q(x) \end{array}\right\} \Rightarrow \mathbf{a+b+c=?}$$

A) 12 B) 9 C) 7 D) 6 E) 4

13. $$\left.\begin{array}{l} P(x)=mx^3+2nx+7 \\ P(1)=2-3m \end{array}\right\} \Rightarrow \mathbf{P(2)=?}$$

A) –5 B) –3 C) –1 D) 1 E) 3

14. $$\left.\begin{array}{l} \operatorname{der}[P(x)\cdot Q(x)]=10 \\ \operatorname{der}\left[\dfrac{P(x)}{Q(x)}\right]=2 \end{array}\right\} \Rightarrow \mathbf{der[P(x)]=?}$$

A) 4 B) 5 C) 6 D) 8 E) 12

15. $$\left.\begin{array}{l} \operatorname{der}[P^2(x)\cdot Q(x)]=20 \\ \operatorname{der}\left[\dfrac{P^3(x)}{Q^2(x)}\right]=2 \end{array}\right\} \Rightarrow \mathbf{der[Q(x)]=?}$$

A) 8 B) 9 C) 10 D) 11 E) 14

16. $$\begin{array}{l|l} x^5-x^4+x^2+2x+3 & x^2-x \\ \cline{2-2} - & Q(x) \\ \cline{1-1} \quad ax+b & \end{array} \Rightarrow \mathbf{a+b=?}$$

A) 7 B) 6 C) 5 D) 4 E) 3

[AKDENİZ ÜNV. YÖS 2013]

Yanıtlar / Answers

1. D	4. E	7. E	10. A	13. B	16. A
2. D	5. D	8. C	11. B	14. C	
3. A	6. C	9. B	12. A	15. A	

1. $P(2x-1)=3-4x$

$2x-1=-3$

$x=-1$

$P(-3)=3-4\cdot(-1)=3+4=7$

Yanıt / Answer D

---

2. $P(x-3)=x^3+2x^2-3x+5$

$$\left.\begin{aligned}x-3&=-2\\ x&=1\end{aligned}\right\}\Rightarrow P(-2)=1^3+2\cdot1^2-3\cdot1+5$$

$$=1+2-3+5=5$$

Yanıt / Answer D

---

3. $P(x)=3x^4+7x^3+ax^2+a+1$

$$\left.\begin{aligned}&P(1)=3\cdot1^4+7\cdot1^3+a\cdot1^2+a+1=11+2a\\ &P(0)=a+1\end{aligned}\right\}$$

$P(1)=5\cdot P(0)$

$11+2a=5(a+1)$

$11+2a=5a+5$

$6=3a \Rightarrow a=2$

$\Rightarrow P(-1)=3\cdot(-1)^4+7\cdot(-1)^3+2\cdot(-1)^2+2+1$

$=3-7+2+2+1=1$

Yanıt / Answer A

---

4. $P(x+4)=x^2+x-2$

$x=-4 \Rightarrow P(0)=(-4)^2+(-4)-2=16-4-2=10$

$x=-3 \Rightarrow P(1)=(-3)^2+(-3)-2=9-3-2=4$

$P(0)\cdot P(1)=10\cdot4=40$

Yanıt / Answer E

---

5. $P(x-3)=x^3+x^2+ax-6$

$x-3=-2 \Rightarrow x=1$

$x=1 \Rightarrow P(-2)=1^3+1^2+a-6=0$

$=a-4=0 \Rightarrow a=4$

Yanıt / Answer D

---

6. $(x+3)\cdot P(x)=x^3+ax-18$

$x=-3 \Rightarrow (-3+3)\cdot P(-3)=(-3)^3+(-3a)-18$

$0=-27+(-3a)-18 \Rightarrow a=-15$

$x=2 \Rightarrow (2+3)\cdot P(2)=2^3+2\cdot(-15)-18$

$5\cdot P(2)=8+(-30)-18$

$5\cdot P(2)=-40 \Rightarrow P(2)=-8$

Yanıt / Answer C

---

7. $(2x-1)\cdot P(x+3)=3Q(x)+2x^2+7$

$x+3=2 \Rightarrow x=-1 \Rightarrow$

$(2\cdot(-1)-1)\cdot P(-1+3)=3\cdot Q(-1)+2\cdot(-1)^2+7$

$-3\cdot P(2)=3\cdot Q(-1)+2+7$

$P(2)=9 \Rightarrow (-3)\cdot9=3\cdot Q(-1)+2+7$

$-27=3Q(-1)+9$

$-36=3\cdot Q(-1) \Rightarrow Q(-1)=-12$

Yanıt / Answer E

---

8. $P(x)=Q(x) \Rightarrow (a-2b+3)x^2+6=5x^2+(b+1)x+c-5$

$\Rightarrow b+1=0 \quad \wedge \quad c-5=6 \quad \wedge \quad a-2b+3=5$

$b=-1 \qquad c=11 \qquad a+2+3=5$

$a=0$

$a+b+c=11-1+0=10$

Yanıt / Answer C

9. $P(x) = Q(x) \Rightarrow x^3 - 6x = ax^3 + (a + b - 2)x^2 + (c - 1)x$

$\Rightarrow a = 1 \quad , \quad c - 1 = -6 \quad , \quad a + b - 2 = 0$

$c = -5 \qquad 1 + b - 2 = 0$

$b = 1$

$\Rightarrow a + 2b + c = 1 + 2\cdot 1 + (-5) = -2$

Yanıt / Answer B

10. $P(x) = Q(x)$

$\Rightarrow a + b = 0 \ , \ 3 = \dfrac{a+1}{2} \ , \ -c = b + 1 \ , \ d = 4$

$6 = a + 1 \qquad b + c = -1$

$a = 5$

$a + \underbrace{b + c}_{-1} + d = 5 + (-1) + 4 = 8$

Yanıt / Answer A

11. $x = -3 \Rightarrow P(-1) + P(-1) = 2(-3) - 3$

$2 \cdot P(-1) = -9$

$P(-1) = -\dfrac{9}{2}$

Yanıt / Answer B

12. $P(x) = Q(x)$

$\Rightarrow (2a - 1)x^5 - 3x^4 + 2b - 5 = 5x^n - (c + 1)x^4 - 1$

$\Rightarrow (2a - 1)x^5 = 5x^5 \Rightarrow 2a - 1 = 5$

$a = 3$

$-3x^4 = -(c + 1)x^4 \Rightarrow -3 = -(c + 1) \Rightarrow c = 2$

$2b - 5 = -1 \Rightarrow b = 2$

$a + b + c = 3 + 2 + 2 = 12$

Yanıt / Answer A

13. $P(x) = mx^3 + 2nx + 7$

$P(1) = m + 2n + 7 = 2 - 3m$

$4m + 5 = -2n$

$P(2) = 8m + 4n + 7$

$= 8m + (-8m - 10) + 7$

$= 8m - 8m - 10 + 7 = -3$

Yanıt / Answer B

14. $\text{der}\left[P(x) \cdot Q(x)\right] = 10 \Rightarrow p + q = 10$

$\text{der}\left[\dfrac{P(x)}{Q(x)}\right] = 2 \Rightarrow p - q = 2$

$$\begin{array}{r} p + q = 10 \\ + \ \ p - q = 2 \\ \hline 2p = 12 \\ p = 6 \end{array}$$

Yanıt / Answer C

15. $\text{der}\left[P^2(x) \cdot Q(x)\right] = 20 \Rightarrow 2 \,/\, 2p + q = 20$

$\text{der}\left[\dfrac{P^3(x)}{Q^2(x)}\right] = 2 \Rightarrow + \quad 3p - 2q = 2$

$$\begin{array}{r} \hline 7p = 42 \\ p = 6 \end{array}$$

$\Rightarrow 2 \cdot 6 + q = 20$

$q = 8$

Yanıt / Answer A

16. $x^2 - x = 0 \Rightarrow x^2 = x$

$x^2 \cdot x^2 \cdot x + x^2 + 2x + 3 = ax + b$

$x \cdot x \cdot x + x + 2x + 3 = ax + b$

$x + x + 2x + 3 = ax + b$

$4x + 3 = ax + b$

$a = 4, b = 3 \Rightarrow a + b = 4 + 3 = 7$

Yanıt / Answer A

1. $x^3 + ax - 8 = (x-2)\cdot P(x) \Rightarrow$ **a = ?**

A) –2 B) –1 C) 0 D) 1 E) 2

2. $x^3 + 3x^2 - 4x + 2 = (x+2)\cdot P(x) + K \Rightarrow$ **K = ?**

A) 11 B) 12 C) 13 D) 14 E) 15

3. $$\begin{array}{r|l} P(x) & Q(x) \\ \cline{2-2} -\ \cdots & x+2 \\ \hline -5 & \end{array} \Rightarrow \mathbf{P(-2) = ?}$$

A) –7 B) –5 C) –3 D) 3 E) 5

4. $$\begin{array}{r|l} 2x^3-4x^2+3x-5 & x+2 \\ \cline{2-2} -\ \cdots\cdots\cdots & B(x) \\ \hline K(x) & \end{array} \Rightarrow \mathbf{K(x) = ?}$$

A) –43 B) –37 C) –23 D) 13 E) 17

5. $$\begin{array}{r|l} 16x^4+4x^3-x+5 & x+\frac{1}{2} \\ \cline{2-2} -\ \cdots\cdots\cdots & P(x) \\ \hline K(x) & \end{array} \Rightarrow \mathbf{K(x) = ?}$$

A) 4 B) 5 C) 6 D) 8 E) 10

6. $$\begin{array}{r|l} P(x) & 2x^2+3 \\ \cline{2-2} - \quad & x^3-2x^2 \\ \hline 3x+1 & \end{array} \Rightarrow \mathbf{P(1) = ?}$$

A) –1 B) 0 C) 1 D) 2 E) 3

7. $$\begin{array}{r|l} x^5+mx^4+x^3-8x^2+1 & x+1 \\ \cline{2-2} -\ \cdots\cdots\cdots & B(x) \\ \hline -16 & \end{array} \Rightarrow \mathbf{m = ?}$$

A) –11 B) –10 C) –9 D) –8 E) –7

8. $$\begin{array}{r|l} ax^3+2x+4a-1 & x+1 \\ \cline{2-2} - \quad & P(x) \\ \hline K(x) & \end{array}$$

$K(x) = 0 \Rightarrow$ **a = ?**

A) 0 B) 1 C) 2 D) 3 E) 4

9. $\begin{array}{r|l} x^4-2x^3+x^2+1 & x^2-2 \\ \cline{2-2} -\ \cdots\cdots\cdots & B(x) \\ \hline K(x) & \end{array} \Rightarrow \mathbf{K(x)=?}$

A) $-2x+7$ B) $-4x-7$ C) $-4x+7$ D) $2x-7$ E) $4x+7$

10. $m\in\mathbb{N}$

$\begin{array}{r|l} 3x^2+7x-1 & x+m \\ \cline{2-2} -\ \cdots\cdots & Q(x) \\ \hline -3 & \end{array} \Rightarrow \mathbf{m=?}$

A) 1 B) 2 C) 3 D) 4 E) 5

11. $\begin{array}{r|l} x^4+3x^3+2x^2-1 & x^2-x+1 \\ \cline{2-2} -\ \cdots\cdots\cdots & Q(x) \\ \hline K(x) & \end{array} \Rightarrow \mathbf{K(x)=?}$

A) $x-3$ B) $x+3$ C) $x+6$ D) $x-6$ E) $x-8$

12. $\begin{array}{r|l} 2x^3-x^2+3x-4 & x+1 \\ \cline{2-2} -\ \cdots\cdots\cdots & B(x) \\ \hline -10 & \end{array} \Rightarrow \mathbf{B(2)=?}$

A) 6 B) 8 C) 10 D) 12 E) 14

13. $\begin{array}{r|l} x^4+5x^3+mx+n & x^3-1 \\ \cline{2-2} - & B(x) \\ \hline 3x-4 & \end{array} \Rightarrow \mathbf{m-n=?}$

A) 7 B) 8 C) 9 D) 10 E) 11

14. $\begin{array}{r|l} x^3+mx^2+nx+1 & x^2+1 \\ \cline{2-2} - & B(x) \\ \hline 2x+3 & \end{array} \Rightarrow \mathbf{n-m=?}$

A) 1 B) 2 C) 3 D) 4 E) 5

15. $\dfrac{3x-10}{x^2-4x-12}=\dfrac{A}{x-6}+\dfrac{B}{x+2} \Rightarrow \mathbf{A-B=?}$

A) −3 B) −2 C) −1 D) 1 E) 2

16. $\left.\begin{array}{l} \operatorname{der}[P^4(x)\cdot Q^3(x)]=18 \\ \operatorname{der}\left[\dfrac{P^2(x)}{Q(x)}\right]=4 \end{array}\right\} \Rightarrow \mathbf{der[P(x)+Q(x)]=?}$

A) 3 B) 4 C) 5 D) 6 E) 7

Yanıtlar / Answers

1. C	4. A	7. E	10. B	13. E	16. A
2. D	5. C	8. B	11. D	14. E	
3. B	6. A	9. C	12. B	15. C	

1. $x^3 + ax - 8 = (x - 2)\cdot P(x)$

$x = 2 \Rightarrow 2^3 + 2a - 8 = (2 - 2)\cdot P(x)$

$2a = 0$

$a = 0$

Yanıt / Answer C

---

2. $x^3 + 3x^2 - 4x + 2 = (x + 2)P(x) + k$

$x = -2 \Rightarrow$

$(-2)^3 + 3\cdot(-2)^2 - 4\cdot(-2) + 2 = (-2 + 2)\,P(x) + K$

$-8 + 12 + 8 + 2 = K$

$K = 14$

Yanıt / Answer D

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3. $P(x) = Q(x)\cdot(x + 2) - 5$

$x = -2 \Rightarrow P(-2) = Q(-2)\cdot(-2 + 2) - 5$

$P(-2) = -5$

Yanıt / Answer B

---

4. $x + 2 = 0 \Rightarrow x = -2$

$x = -2 \Rightarrow K(x) = 2\cdot(-2)^3 - 4(-2)^2 + 3(-2) - 5$

$= 2(-8) - 4\cdot4 - 6 - 5$

$= -43$

Yanıt / Answer A

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5. $x+\frac{1}{2}=0 \;\Rightarrow\; x=-\frac{1}{2}$

$$K(x)=16\left(-\frac{1}{2}\right)^4+4\left(-\frac{1}{2}\right)^3-\left(-\frac{1}{2}\right)+5$$

$$=1-\frac{1}{2}+\frac{1}{2}+5=6$$

Yanıt / Answer C

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6. $P(x) = (2x^2 + 3)\cdot(x^3 - 2x^2) + 3x + 1$

$\Rightarrow P(1) = (2\cdot(1)^2 + 3)\cdot(1^3 - 2(1^2)) + 3\cdot1 + 1$

$= (2 + 3)\cdot(1 - 2) + 3 + 1$

$= 5\cdot(-1) + 4 = -5 + 4 = -1$

Yanıt / Answer A

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7. $x^5 + mx^4 + x^3 - 8x^2 + 1 = P(x)$

$$\begin{array}{r|l} P(x) & x+1 \\ \cline{2-2} \underline{-\quad\quad} & B(x) \\ -16 & \end{array}$$

$\Rightarrow P(-1) = (-1)^5 + m(-1)^4 + (-1)^3 - 8\cdot(-1)^2 + 1 = -16$

$= -1 + m - 1 - 8 + 1 = -16$

$= m - 9 = -16$

$m = -7$

Yanıt / Answer E

8.

$$\begin{array}{r|l} ax^3 + 2x + 4a - 1 & x+1 \\ \cline{2-2} \underline{-\quad\quad\quad\quad\quad} & P(x) \\ K(x) & \end{array}$$

$x + 1 = 0 \Rightarrow x = -1$

$K(x) = a(-1)^3 + 2(-1) + 4a - 1 = 0$

$-a - 2 + 4a - 1 = 0$

$3a = 3$

$a = 1$

Yanıt / Answer B

9. $x^2 - 2 = 0 \Rightarrow x^2 = 2$

$P(x) = (x^2)^2 - 2{\cdot}x^2{\cdot}x + x^2 + 1$

$K(x) = 2^2 - 2{\cdot}2{\cdot}x + 2 + 1$

$= 7 - 4x$

Yanıt / Answer C

10. $x+m=0 \Rightarrow x=-m$

$x=-m \Rightarrow 3(-m)^2+7(-m)-1=-3$

$3m^2-7m+2=0$

$(3m-1)\cdot(m-2)=0$

$m=\dfrac{1}{3}$ veya(or) $m=2$

$m \in N \Rightarrow m=2$

Yanıt / Answer B

11. $x^2 - x + 1 = 0 \Rightarrow x^2 = x - 1$

$(x^2)^2 + 3x{\cdot}x^2 + 2x^2 - 1 = (x^2 - x + 1){\cdot}Q(x) + K(x)$

$x^2 = x - 1 \Rightarrow K(x) = (x-1)^2 + 3x(x-1) + 2(x-1) - 1$

$= x^2 - 2x + 1 + 3x^2 - 3x + 2x - 2 - 1$

$= 4x^2 - 3x - 2$

$= 4(x-1) - 3x - 2$

$= 4x - 4 - 3x - 2$

$= x - 6$

Yanıt / Answer D

12.

$$\begin{array}{r|l} 2x^3 - x^2 + 3x - 4 & x + 1 \\ \cline{2-2} \underline{-2x^3 - 2x^2} & 2x^2 - 3x + 6 \\ 0 - 3x^2 + 3x - 4 & \\ \underline{+\,3x^2 + 3x} & \\ 6x - 4 & \\ \underline{-6x - 6} & \\ -10 & \end{array}$$

$\Rightarrow B(x) = 2x^2 - 3x + 6$

$B(2) = 2{\cdot}2^2 - 3{\cdot}2 + 6 = 8 - 6 + 6 = 8$

Yanıt / Answer B

13.

$$\begin{array}{r|l} x^4 + 5x^3 + mx + n & x^3 - 1 \\ \cline{2-2} \underline{-\qquad\qquad\qquad} & B(x) \\ 3x - 4 & \end{array}$$

$x^3 - 1 = 0 \Rightarrow x^3 = 1$

$x^4 + 5x^3 + mx + n = x{\cdot}x^3 + 5{\cdot}x^3 + mx + n = 3x - 4$

$x + 5 + mx + n = 3x - 4$

$(m+1)x + 5 + n = 3x - 4$

$m + 1 = 3 \qquad 5 + n = -4$

$m = 2 \qquad n = -9$

$m - n = 2 - (-9) = 11$

Yanıt / Answer E

14.

$$\begin{array}{r|l} x^3 + mx^2 + nx + 1 & x^2 + 1 \\ \cline{2-2} \underline{-\qquad\qquad\qquad} & B(x) \\ 2x + 3 & \end{array}$$

$x^2 + 1 = 0 \Rightarrow x^2 = -1$

$x^3 + mx^2 + nx + 1 = x^2{\cdot}x + mx^2 + nx + 1$

$= -x - m + nx + 1 = 2x + 3$

$(n-1)x + 1 - m = 2x + 3$

$n - 1 = 2 \qquad 1 - m = 3$

$n = 3 \qquad m = -2$

$n - m = 5$

Yanıt / Answer E

15. $\dfrac{3x-10}{x^2-4x-12} = \dfrac{A}{x-6} + \dfrac{B}{x+2}$

$\dfrac{3x-10}{x^2-4x-12} = \dfrac{A(x+2)+B(x-6)}{x^2-4x-12}$

$3x-10 = Ax+2A+Bx-6B$

$3x-10 = (A+B)x+2A-6B$

$$\Rightarrow \left.\begin{array}{l} A+B=3 \\ 2A-6B=-10 \end{array}\right\} \Rightarrow A=1 \quad B=2$$

$\Rightarrow A-B=1-2=-1$

Yanıt / Answer C

16. $4p+3q=18$

$3/\quad 2p-q=4$

$10p=30$

$p=3$

$2\cdot3-q=4 \Rightarrow q=2$

$\text{der}[P(x)+Q(x)]=\max(p,q)$

$=\max(3,2)=3$

Yanıt / Answer A

1. $$\begin{array}{l|l} 3x^3+x^2-x-1 & \underline{x-1} \\ \underline{-\qquad\qquad\qquad} & \\ \qquad k & \end{array} \Rightarrow \mathbf{k=?}$$

A) 1 B) 2 C) 4 D) 8 E) 12

2. $P(x)=x^7+x^4-2x^3+3$

$$\begin{array}{l|l} \quad P(x) & \underline{x+1} \\ \underline{-\qquad\quad} & \\ \quad k & \end{array} \Rightarrow \mathbf{k=?}$$

A) 5 B) 4 C) 3 D) 2 E) 1

3. $P(x)=x^4-3x^2+x-5$

$$\begin{array}{l|l} \quad P(x) & \underline{x-2} \\ \underline{-\qquad\quad} & \\ \quad k & \end{array} \Rightarrow \mathbf{k=?}$$

A) 8 B) 6 C) 4 D) 2 E) 1

4. $P(x)=(x-5)^m+(x-2)^m+1$

$$\begin{array}{l|l} \quad P(x) & \underline{x-3} \\ \underline{-\qquad\quad} & \\ \quad -6 & \end{array} \Rightarrow \mathbf{m=?}$$

A) 5 B) 3 C) 1 D) –1 E) –3

5. $P(x)=(x^2-x)\cdot Q(x)+2x-3$

$$\begin{array}{l|l} \quad P(x) & \underline{x-2} \\ \underline{-\qquad\quad} & \\ \quad 5 & \end{array} \qquad \begin{array}{l|l} \quad Q(x) & \underline{x-2} \\ \underline{-\qquad\quad} & \\ \quad k & \end{array}$$

$\Rightarrow \mathbf{k=?}$

A) 1 B) 2 C) 3 D) 6 E) 8

6. $P(x)=x^3-ax^2-9$

$$\begin{array}{l|l} \quad P(x) & \underline{x-1} \\ \underline{-\qquad\quad} & \\ \quad 10 & \end{array} \Rightarrow \mathbf{a=?}$$

A) –12 B) –14 C) –16 D) –18 E) –24

7. $P(x^4+1) = x^8 - 3x + 5$

$$\begin{array}{l|l} \quad P(x) & x-2 \\ \cline{2-2} \underline{-\qquad\quad} & \\ \quad\ k & \end{array} \Rightarrow \mathbf{k = ?}$$

A) 3 B) 5 C) 8 D) 11 E) 13

8. $P(x) = x^6 - 2x^4 + 3x^2 - 1$

$$\begin{array}{l|l} \quad P(x) & x-\sqrt{2} \\ \cline{2-2} \underline{-\qquad\quad} & \\ \quad\ k & \end{array} \Rightarrow \mathbf{k = ?}$$

A) –1 B) 1 C) 5 D) 7 E) 12

9. $P(x) = (x-3)^{2n+1} + (x+1)^{2n} + x + 1$

$$\begin{array}{l|l} \quad P(x) & x-1 \\ \cline{2-2} \underline{-\qquad\quad} & \\ \quad -14 & \end{array} \Rightarrow \mathbf{n = ?}$$

A) –2 B) –1 C) 1 D) 2 E) 4

10. $P(7x+3) = 3x^7 + 4x^2 - 5ax + 1$

$$\begin{array}{l|l} \quad P(x) & 2x+8 \\ \cline{2-2} \underline{-\qquad\quad} & \\ \quad 12 & \end{array} \Rightarrow \mathbf{a = ?}$$

A) –4 B) –2 C) 0 D) 2 E) 4

11. $$\frac{P(x-2)+3}{x^2-1} = Q(x+1)$$

$$\begin{array}{l|l} \quad Q(x) & x-3 \\ \cline{2-2} \underline{-\qquad\quad} & \\ \quad\ 5 & \end{array} \qquad \begin{array}{l|l} \quad P(x) & x \\ \cline{2-2} \underline{-\qquad\quad} & \\ \quad\ k & \end{array}$$

$\Rightarrow$ **k = ?**

A) 12 B) 14 C) 18 D) 20 E) 24

12. $P(3x+1) = x^3 - 5x^2 + 4x + 6$

$$\begin{array}{l|l} \quad P(x+1) & x+3 \\ \cline{2-2} \underline{-\qquad\qquad} & Q(x) \\ \quad\ k & \end{array} \Rightarrow \mathbf{k = ?}$$

A) –12 B) –8 C) –6 D) –4 E) –2

13. $P(3x-4) = x^4 + 3x^3 - x^2 + x - 1$

$$\begin{array}{l|l} \quad P(x+2) & x+3 \\ \cline{2-2} \underline{-\qquad\qquad} & \\ \quad\ a & \end{array} \Rightarrow \mathbf{a = ?}$$

A) 3 B) 4 C) 5 D) 7 E) 9

Yanıtlar / Answers

1. B	4. B	7. A	10. D	13. A
2. A	5. B	8. C	11. A	
3. E	6. D	9. D	12. D	

1.

$$\begin{array}{r|l} 3x^3+x^2-x-1 & x-1 \\ \cline{2-2} - & \\ \hline k & \end{array}$$

$x-1=0 \Rightarrow x=1$

$k=3\cdot(1)^3+(1)^2-1-1=2$

Yanıt / Answer B

2. $P(x)=x^7+x^4-2x^3+3$

$$\begin{array}{r|l} P(x) & x+1 \\ \cline{2-2} - & \\ \hline k & \end{array}$$

$$\left.\begin{array}{r} x+1=0 \\ x=-1 \end{array}\right\} \Rightarrow k=P(-1)=(-1)^7+(-1)^4-2(-1)^3+3$$

$$=-1+1+2+3=5$$

Yanıt / Answer A

3. $P(x)=x^4-3x^2+x-5$

$$\begin{array}{r|l} P(x) & x-2 \\ \cline{2-2} - & \\ \hline k & \end{array}$$

$$\left.\begin{array}{r} x-2=0 \\ x=2 \end{array}\right\} \Rightarrow k=P(2)=(2)^4-3\cdot(2)^2+2-5$$

$$=16-12+2-5=1$$

Yanıt / Answer E

4. $P(x)=(x-5)^m+(x-2)^m+1$

$$\begin{array}{r|l} P(x) & x-3 \\ \cline{2-2} - & \\ \hline -6 & \end{array}$$

$$\left.\begin{array}{r} x-3=0 \\ x=3 \end{array}\right\} \Rightarrow P(3)=-6=(3-5)^m+(3-2)^m+1$$

$$-6=(-2)^m+1^m+1$$

$$-6=(-2)^m+1+1$$

$$-8=(-2)^m \Rightarrow m=3$$

Yanıt / Answer B

5. $P(x)=(x^2-x)\cdot Q(x)+2x-3$

$$\begin{array}{r|l} P(x) & x-2 \\ \cline{2-2} - & \\ \hline 5 & \end{array} \qquad \left.\begin{array}{r} x-2=0 \\ x=2 \end{array}\right\} \Rightarrow P(2)=5$$

$$\begin{array}{r|l} Q(x) & x-2 \\ \cline{2-2} - & \\ \hline k & \end{array} \qquad \left.\begin{array}{r} x-2=0 \\ x=2 \end{array}\right\} \Rightarrow Q(2)=k$$

$P(2)=(4-2)\cdot Q(2)+2\cdot 2-3$

$5=2\cdot k+4-3$

$5=1+2k \Rightarrow k=2$

Yanıt / Answer B

6. $P(x)=x^3-ax^2-9$

$$\begin{array}{r|l} P(x) & x-1 \\ \cline{2-2} - & \\ \hline 10 & \end{array} \qquad \left.\begin{array}{r} x-1=0 \\ x=1 \end{array}\right\} \Rightarrow P(1)=10$$

$P(1)=(1)^3-a\cdot(1)^2-9 \Rightarrow 10=1-a-9$

$18=-a$

$a=-18$

Yanıt / Answer D

7. $P(x^4+1)=x^8-3x+5$

$$\begin{array}{r|l} P(x) & x-2 \\ \cline{2-2} -\underline{\qquad} & \\ k & \end{array}$$

$$\left.\begin{array}{r} x-2=0 \\ x=2 \\ P(2)=k \end{array}\right\} \Rightarrow x=1 \Rightarrow \begin{array}{l} P(1^4+1)=(1)^8-3\cdot 1+5 \\ P(2)=1-3+5 \\ P(2)=3 \end{array}$$

Yanıt / Answer A

8. $P(x)=x^6-2x^4+3x^2-1$

$$\begin{array}{r|l} P(x) & x-\sqrt{2} \\ \cline{2-2} -\underline{\qquad} & \\ k & \end{array}$$

$$\left.\begin{array}{r} x-\sqrt{2}=0 \\ x=\sqrt{2} \\ P(\sqrt{2})=k \end{array}\right\} \Rightarrow P(\sqrt{2})=(\sqrt{2})^6-2\cdot(\sqrt{2})^4+3(\sqrt{2})^2-1$$

$$P(\sqrt{2})=8-2\cdot 4+3\cdot 2-1$$

$$k=8-8+6-1=5$$

Yanıt / Answer C

9. $P(x)=(x-3)^{2n+1}+(x+1)^{2n}+x+1$

$$\begin{array}{r|l} P(x) & x-1 \\ \cline{2-2} -\underline{\qquad} & \\ -14 & \end{array}$$

$$\left.\begin{array}{r} x-1=0 \\ x=1 \\ P(1)=-14 \end{array}\right\} \Rightarrow P(1)=(1-3)^{2n+1}+(1+1)^{2n}+1+1$$

$$-14=(-2)^{2n+1}+2^{2n}+2$$

$$=(-2)^{2n}\cdot(-2)+2^{2n}+2$$

$$-14=-2^{2n}+2$$

$$-16=-2^{2n} \Rightarrow 2n=4 \Rightarrow n=2$$

Yanıt / Answer D

10. $P(7x+3)=3x^7+4x^2-5ax+1$

$$\begin{array}{r|l} P(x) & 2x+8 \\ \cline{2-2} -\underline{\qquad} & \\ 12 & \end{array}$$

$$\left.\begin{array}{r} 2x+8=0 \\ x=-4 \\ P(-4)=12 \end{array}\right\} \Rightarrow \begin{array}{r} 7x+3=-4 \\ 7x=-7 \\ x=-1 \end{array}$$

$$\Rightarrow P(7\cdot(-1)+3)=3\cdot(-1)^7+4\cdot(-1)^2-5a\cdot(-1)+1$$

$$P(-4)=3\cdot(-1)+4\cdot 1+5a+1$$

$$P(-4)=-3+4+5a+1$$

$$12=2+5a \Rightarrow a=2$$

Yanıt / Answer D

11. $\dfrac{P(x-2)+3}{x^2-1}=Q(x+1)$

$$\begin{array}{r|l} Q(x) & (x-3) \\ \cline{2-2} -\underline{\qquad} & \\ 5 & \end{array} \Rightarrow Q(3)=5 \qquad \begin{array}{r|l} P(x) & x \\ \cline{2-2} -\underline{\qquad} & \\ k & \end{array} \Rightarrow P(0)=k$$

$P(x-2)+3=Q(x+1)\cdot(x^2-1)$

$x=2 \Rightarrow P(0)+3=Q(3)\cdot 3$

$k+3=5\cdot 3 \Rightarrow k=12$

Yanıt / Answer A

12. $P(3x+1)=x^3-5x^2+4x+6$

$$\begin{array}{r|l} P(x+1) & x+3 \\ \cline{2-2} -\underline{\qquad} & Q(x) \\ k & \end{array}$$

$$\left.\begin{array}{r} x+3=0 \\ x=-3 \\ P(-2)=k \end{array}\right\} \Rightarrow \begin{array}{r} 3x+1=-2 \\ 3x=-3 \\ x=-1 \end{array}$$

$$P(3\cdot(-1)+1)=(-1)^3-5(-1)^2+4\cdot(-1)+6$$

$$P(-2)=-1-5-4+6$$

$$P(-2)=k=-4$$

Yanıt / Answer D

13. $P(3x-4)=x^4+3x^3-x^2+x-1$

$$\begin{array}{r|l} P(x+2) & x+3 \\ \cline{2-2} -\underline{\qquad} & \\ a & \end{array}$$

$$\left.\begin{array}{r} x+3=0 \\ x=-3 \\ P(-1)=a \end{array}\right\} \Rightarrow \begin{array}{r} 3x-4=-1 \\ 3x=3 \\ x=1 \end{array}$$

$$P(3\cdot(1)-4)=(1)^4+3\cdot(1)^3-(1)^2+1-1$$

$$P(-1)=1+3-1+1-1$$

$$P(-1)=a=3$$

Yanıt / Answer A

1. $$\begin{array}{c|l} P(x) & x^2+3 \\ \cline{2-2} - & x+4 \\ \hline k(x) & \end{array} \qquad \left.\begin{array}{r} P(-1)=18 \\ P(2)=60 \end{array}\right\} \Rightarrow \mathbf{k(x)=?}$$

A) $2x+5$ B) $3x+6$ C) $4x+8$
D) $5x+10$ E) $4x+10$

2. $$\begin{array}{c|l} P(x) & x-2 \\ \cline{2-2} - & \\ \hline -5 & \end{array} \qquad \begin{array}{c|l} P(x) & x+3 \\ \cline{2-2} - & \\ \hline 20 & \end{array}$$

$$\Rightarrow \begin{array}{c|l} \mathbf{P(x)} & \mathbf{x^2+x-6} \\ \cline{2-2} - & \\ \hline \mathbf{?} & \end{array}$$

A) $-5x+5$ B) $4x-7$ C) $5x+2$
D) $3x+1$ E) $4x+8$

3. $$\begin{array}{c|l} P(x) & x-3 \\ \cline{2-2} - & \\ \hline 6 & \end{array} \qquad \begin{array}{c|l} P(x) & x-4 \\ \cline{2-2} - & \\ \hline 10 & \end{array}$$

$$\Rightarrow \begin{array}{c|l} \mathbf{P(x)} & \mathbf{x^2-7x+12} \\ \cline{2-2} - & \\ \hline \mathbf{?} & \end{array}$$

A) $2x-3$ B) $2x-5$ C) $2x-6$
D) $4x-6$ E) $4x+6$

4. $P(x)=x^3-2x^2+ax+b$

$$\begin{array}{c|l} P(x) & x^2-3x+2 \\ \cline{2-2} - & Q(x) \\ \hline 0 & \end{array} \quad \Rightarrow \mathbf{a=?}$$

A) -1 B) -3 C) -4 D) -7 E) -9

5. $$\begin{array}{c|l} P(2x+1) & x+3 \\ \cline{2-2} - & \\ \hline -7 & \end{array} \qquad \begin{array}{c|l} P(x-2) & x-1 \\ \cline{2-2} - & \\ \hline -3 & \end{array}$$

$$\Rightarrow \begin{array}{c|l} \mathbf{P(x)} & \mathbf{x^2+6x+5} \\ \cline{2-2} - & \\ \hline \mathbf{k(x)=?} & \end{array}$$

A) $x+2$ B) $x-2$ C) $2x-1$
D) $2x+1$ E) $2x-3$

6. $P(x)=x^4-mx^3+4x^2-1$

$$\begin{array}{c|l} P(x) & x-1 \\ \cline{2-2} - & \\ \hline a & \end{array} \qquad \begin{array}{c|l} P(x) & x+1 \\ \cline{2-2} - & \\ \hline b & \end{array}$$

$a=2b \Rightarrow \mathbf{m=?}$

A) -2 B) $-\frac{3}{2}$ C) $-\frac{4}{3}$ D) -1 E) $-\frac{1}{2}$

7. $\begin{array}{r|l} P(x) & x+2 \\ \cline{2-2} \underline{-\quad} & \\ 5 & \end{array}$ $\quad$ $\begin{array}{r|l} P(x) & x-1 \\ \cline{2-2} \underline{-\quad} & \\ 2 & \end{array}$

$\begin{array}{r|l} P(x) & x^2+x-2 \\ \cline{2-2} \underline{-\quad} & \\ k(x) & \end{array} \Rightarrow$ **k(x) = ?**

A) $x + 3$ B) $3x + 1$ C) $3 - x$

D) $3x - 1$ E) $3x$

8. $P(3x - 4) = x^3 + 3x^2 - 8x + 1$

$\begin{array}{r|l} P(x+2) & x+3 \\ \cline{2-2} \underline{-\quad} & \\ k & \end{array} \Rightarrow$ **k=?**

A) -5 B) -4 C) -3 D) -2 E) -1

9. $\begin{array}{r|l} P(x) & x-1 \\ \cline{2-2} \underline{-\quad} & \\ 2 & \end{array}$ $\quad$ $\begin{array}{r|l} P(x) & x+1 \\ \cline{2-2} \underline{-\quad} & \\ 4 & \end{array}$

$\begin{array}{r|l} P(x) & x^2-1 \\ \cline{2-2} \underline{-\quad} & \\ k(x) & \end{array} \Rightarrow$ **k(x)=?**

A) $x + 3$ B) $x - 3$ C) $-x + 3$

D) $2x + 3$ E) $2x - 3$

10. $P(x) = (x^2 + x - 2) \cdot Q(x + 1)$

$\begin{array}{r|l} Q(x) & x-4 \\ \cline{2-2} \underline{-\quad} & \\ 3 & \end{array}$ $\quad$ $\begin{array}{r|l} P(x) & x-3 \\ \cline{2-2} \underline{-\quad} & \\ k & \end{array}$

$\Rightarrow$ **k=?**

A) 30 B) 24 C) 20 D) 18 E) 12

11. $\begin{array}{r|l} x^3 - mx^2 + nx - 4 & (x-1)^2 \\ \cline{2-2} \underline{-\quad} & \\ 0 & \end{array} \Rightarrow$ **m = ?**

A) -2 B) 0 C) 2 D) 4 E) 6

12. $P(x) = 4x^3 + 2x^2 + ax + 5$

$\begin{array}{r|l} P(x) & x-a^2 \\ \cline{2-2} \underline{-\quad} & \\ 12 & \end{array} \Rightarrow$ **a = ?**

A) 0 B) -1 C) 1 D) 2 E) -2

13. $P(x) = 3x + a$

$x^3 + x^2 - 2x + 4 = (x - 3)\cdot Q(x) + P(x)$

$\Rightarrow$ **a = ?**

A) 25 B) -15 C) 0 D) -15 E) -25

14. $x^3 + mx - 2 = (x - 1)\cdot P(x)$

$\Rightarrow$ **P(2) = ?**

A) 8 B) 5 C) 3

D) 10 E) 13

[YTÜ-YÖS 2012]

Yanıtlar / Answers

1. E	4. A	7. C	10. A	13. A
2. A	5. B	8. C	11. E	14. A
3. D	6. C	9. C	12. C	

1. $P(x) = (x^2 + 3)\cdot(x + 4) + K(x)$

$P(-1) = 4\cdot 3 + K(-1) = 18 \Rightarrow K(-1) = 6$

$P(2) = 7\cdot 6 + K(2) = 60 \Rightarrow K(2) = 18$

$K(x) = mx + n \Rightarrow K(-1) = -m + n = 6$

$K(2) = 2m + n = 18$

$m = 4, \quad n = 10$

$\Rightarrow K(x) = 4x + 10$

Yanıt / Answer E

2.

$$\begin{array}{r|l} P(x) & x-2 \\ \hline -5 & \end{array} \Rightarrow P(2) = -5$$

$$\begin{array}{r|l} P(x) & x+3 \\ \hline 20 & \end{array} \Rightarrow P(-3) = 20$$

$$\begin{array}{r|l} P(x) & x^2+x-6 \\ \hline K(x)=mx+n & Q(x) \end{array}$$

$x^2 + x - 6 = 0$

$(x+3)(x-2) = 0$

$x = -3, \quad x = 2$

$P(2) = 2m + n = -5$

$P(-3) = -3m + n = 20$

$\Rightarrow m = -5, \quad n = 5$

$\Rightarrow K(x) = -5x + 5$

Yanıt / Answer A

---

3. $P(3) = 6, \quad P(4) = 10$

$P(x) = (x^2 - 7x + 12)\cdot Q(x) + K(x)$

$P(x) = (x-3)\cdot(x-4)\cdot Q(x) + K(x)$

$$\left.\begin{array}{l} P(3) = (3-3)\cdot(3-4)\cdot Q(3) + K(3) \\ \quad = 0 + K(3) \end{array}\right\} \Rightarrow K(3) = 6$$

$$\left.\begin{array}{l} P(4) = (4-3)\cdot(4-4)\cdot Q(4) + K(4) \\ \quad = 0 + K(4) \end{array}\right\} \Rightarrow K(4) = 10$$

$K(x) = mx + n \Rightarrow K(3) = 3m + n = 6$

$K(4) = 4m + n = 10$

$m = 4, \; n = -6$

$K(x) = 4x - 6$

Yanıt / Answer D

---

4. $P(x) = x^3 - 2x^2 + ax + b$

$$\begin{array}{r|l} P(x) & x^2-3x+2 \\ \hline 0 & Q(x) \end{array}$$

$$\left.\begin{array}{l} x^2 - 3x + 2 = 0 \\ x^2 = 3x - 2 \end{array}\right\} \Rightarrow$$

$P(x) = x\cdot(x^2) - 2x^2 + ax - b$

$K(x) = x\cdot(3x-2) - 2\cdot(3x-2) + ax - b = 0$

$= 3x^2 - 2x - 6x + 4 + ax - b = 0$

$= 3\cdot(3x-2) - 2x - 6x + 4 + ax - b = 0$

$= 9x - 6 - 2x - 6x + 4 + ax - b = 0$

$= (a+1)x + 10 - b = 0$

$\Rightarrow a + 1 = 0 \Rightarrow a = -1$

Yanıt / Answer A

5.

$$\begin{array}{r|l} P(2x+1) & x+3 \\ \hline -7 & \end{array} \qquad x + 3 = 0 \Rightarrow x = -3 \qquad \Rightarrow P(-5) = -7$$

$$\begin{array}{r|l} P(x-2) & x-1 \\ \hline -3 & \end{array} \qquad x - 1 = 0 \Rightarrow x = 1 \qquad \Rightarrow P(-1) = -3$$

$$\begin{array}{r|l} P(x) & x^2+6x+5 \\ \hline K(x) & Q(x) \end{array}$$

$P(x) = (x + 5)\cdot(x + 1)\cdot Q(x) + K(x)$

$P(-5) = 0 + K(-5)$

$P(-1) = 0 + K(-1)$

$K(x) = mx + n \Rightarrow K(-5) = -5m + n = -7$

$K(-1) = -m + n = -3$

$m = 1 \quad n = -2$

$K(x) = x - 2$

Yanıt / Answer B

---

6. $P(x) = x^4 - mx^3 + 4x^2 - 1$

$P(1) = a, \quad P(-1) = b$

$$\left.\begin{array}{l} P(1) = 1 - m + 4 - 1 = 4 - m = a \\ P(-1) = 1 + m + 4 - 1 = 4 + m = b \end{array}\right\} \Rightarrow$$

$a = 2b \Rightarrow 4 - m = 2\cdot(4 + m)$

$4 - m = 8 + 2m$

$-4 = 3m \Rightarrow m = -\dfrac{4}{3}$

Yanıt / Answer C

7. $P(-2) = 5, \quad P(1) = 2$

$$\begin{array}{r|l} P(x) & x^2 + x - 2 \\ \cline{2-2} - \qquad & Q(x) \\ \cline{1-1} K(x) & \end{array}$$

$\Rightarrow P(x) = (x^2 + x - 2)\cdot Q(x) + K(x)$

$P(x) = (x + 2)\cdot(x - 1)\cdot Q(x) + K(x)$

$P(-2) = K(-2)$

$P(1) = K(1)$

$K(x) = mx + n \Rightarrow K(-2) = -2m + n = 5$

$K(1) = m + n = 2 \Rightarrow m = -1 \quad n = 3$

$\Rightarrow K(x) = -x + 3$

Yanıt / Answer C

8.

$$\begin{array}{r|l} P(x+2) & x + 3 \\ \cline{2-2} - \qquad & \\ \cline{1-1} k & \end{array} \Rightarrow \begin{array}{l} x + 3 = 0 \Rightarrow x = -3 \\ P(-1) = k \end{array}$$

$3x - 4 = -1 \Rightarrow x = 1$

$k = P(-1) = (1)^3 + 3(1)^2 - 8\cdot 1 + 1 = 1 + 3 - 8 + 1 = -3$

Yanıt / Answer C

9. $P(1) = 2, \quad P(-1) = 4$

$$\begin{array}{r|l} P(x) & x^2 - 1 \\ \cline{2-2} - \qquad & Q(x) \\ \cline{1-1} K(x) & \end{array}$$

$\Rightarrow P(x) = (x^2 - 1)\cdot Q(x) + K(x)$

$P(x) = (x - 1)\cdot(x + 1)\cdot Q(x) + K(x)$

$P(1) = K(1)$

$P(-1) = K(-1)$

$K(x) = mx + n \Rightarrow K(1) = m + n = 2$

$K(-1) = -m + n = 4$

$\Rightarrow m = -1, \quad n = 3$

$K(x) = -x + 3$

Yanıt / Answer C

10. $P(x) = (x^2 + x - 2)\cdot Q(x + 1)$

$$\begin{array}{r|l} Q(x) & x - 4 \\ \cline{2-2} - \qquad & \\ \cline{1-1} 3 & \end{array} \Rightarrow Q(4) = 3 \qquad \begin{array}{r|l} P(x) & x - 3 \\ \cline{2-2} - \qquad & \\ \cline{1-1} k & \end{array} \Rightarrow P(3) = k$$

$P(3) = (3^2 + 3 - 2)\cdot Q(4) = k \Rightarrow 10\cdot 3 = 30 = k$

Yanıt / Answer A

11. $P(x) = x^3 - mx^2 + nx - 4$

$(x - 1)^2 = 0 \Rightarrow (x - 1)\cdot(x - 1) = 0$

$x = 1, \quad x = 1$

$P(1) = 1^3 - m + n - 4 = 0 \Rightarrow m - n = -3$

$P'(x) = 3x^2 - 2mx + n$

$P'(1) = 3\cdot(1)^2 - 2m\cdot 1 + n = 0 \Rightarrow 2m - n = 3$

$$\begin{array}{rl} -/ & m - n = -3 \\ & 2m - n = 3 \\ \hline & m = 6 \end{array}$$

Yanıt / Answer E

12. $P(x) = 4x^3 + 2x^2 + ax + 5$

$x - a^2 = 0 \Rightarrow x = a^2$

$\Rightarrow P(a^2) = 4a^6 + 2\cdot a^4 + a\cdot a^2 + 5 = 12$

$= 4a^6 + 2a^4 + a^3 = 7$

$\Rightarrow a = 1$

Yanıt / Answer C

13. $P(x) = 3x + a$

$\Rightarrow x^3 + x^2 - 2x + 4 = (x - 3)\cdot Q(x) + 3x + a$

$x^3 + x^2 - 5x + 4 - a = (x - 3)\cdot Q(x)$

$x = 3 \Rightarrow 3^3 + 3^2 - 5\cdot 3 + 4 - a = 0$

$27 + 9 - 15 + 4 - a = 0$

$25 - a = 0 \Rightarrow a = 25$

Yanıt / Answer A

14. $x = 1 \Rightarrow 1^3 + m\cdot 1 - 2 = (1 - 1)\cdot P(1)$

$1 + m - 2 = 0$

$m = 1$

$x = 2 \Rightarrow 2^3 + 1\cdot 2 - 2 = (2 - 1)\cdot P(2)$

$8 + 2 - 2 = P(2)$

$8 = P(2)$

Yanıt / Answer A

İKİNCİ DERECEDEN DENKLEMLER
QUADRATIC EQUATIONS

BÖLÜM
CHAPTER 2

İkinci Dereceden Denklemler / Quadratic Equations

Test 1

1. $x^2 + 2x - 35 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) {–7, 5} B) {–7, 3} C) {7, 5}

D) {7, 3} E) {3, 5}

2. $9x^2 - 10x + 1 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{\frac{1}{3}, 1\right\}$ B) $\left\{\frac{1}{6}, 1\right\}$ C) $\left\{\frac{1}{9}, 1\right\}$

D) $\left\{-\frac{1}{9}, -1\right\}$ B) $\left\{-\frac{1}{6}, -1\right\}$

3. $4x^2 - 12x + 9 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{\frac{2}{3}, \frac{3}{2}\right\}$ B) $\left\{\frac{2}{3}\right\}$ C) $\left\{\frac{3}{2}\right\}$

D) $\left\{\frac{1}{2}\right\}$ E) $\varnothing$

4. $2x^2 + 4x - 5 = 0 \Rightarrow$ **Δ = ?**

A) –24 B) –12 C) 12 D) 36 E) 56

5. $4x^2 - 3x + 1 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{-\frac{1}{3}\right\}$ B) $\left\{\frac{1}{4}\right\}$ C) $\left\{\frac{2}{3}\right\}$

D) $\left\{-\frac{1}{3}, \frac{1}{4}\right\}$ E) $\varnothing$

6. $2x^3 - 9x^2 + 4x = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{0, -\frac{1}{2}, -\frac{1}{4}\right\}$ B) $\left\{0, \frac{1}{2}, 4\right\}$ C) $\left\{0, 1, \frac{1}{2}\right\}$

D) $\left\{-\frac{1}{2}, 0, \frac{1}{2}\right\}$ E) $\left\{\frac{1}{2}, 4\right\}$

7. $5x^2 - 7x = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\{0\}$ B) $\left\{0, \frac{5}{7}\right\}$ C) $\left\{0, -\frac{5}{7}\right\}$

D) $\left\{0, -\frac{7}{5}\right\}$ E) $\left\{0, \frac{7}{5}\right\}$

8. $4x^2 - 9 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{-\frac{3}{2}\right\}$ B) $\left\{\frac{3}{2}\right\}$ C) $\left\{-\frac{3}{2}, \frac{3}{2}\right\}$

D) $\left\{-\frac{9}{4}\right\}$ E) $\left\{\frac{9}{4}\right\}$

9. $3x^2 - 12 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) {−4} B) {4} C) {−2}
D) {2} E) {−2, 2}

10. $2x^2 + 8 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) {−4} B) {4} C) {−2}
D) {2} E) ∅

11. $x^2 - 2x - 4 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\{-\sqrt{5}\}$ B) $\{\sqrt{5}\}$ C) $\{1-\sqrt{5}\}$
D) $\{1-\sqrt{5}, 1+\sqrt{5}\}$ E) ∅

12. $x^2 + 2x - 6 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\{-1 \mp \sqrt{7}\}$ B) $\{-1 \mp \sqrt{5}\}$ C) $\{-1 \mp \sqrt{3}\}$
D) $\{-1 \mp \sqrt{2}\}$ E) $\{1 \mp \sqrt{3}\}$

13. $(m^2 - 4)x^2 - mx - 2m^2 + m + 7 = 0$
$x_1 = -1$, $m \in R^+ \Rightarrow$ **m = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

14. $mx^2 - (m + 3)x + m - 5 = 0$
$x_1 = x_2$, $m \in Z^+ \Rightarrow$ **m = ?**

A) 5 B) 6 C) 7 D) 9 E) 10

15. $\frac{5}{x-2} + x^2 = 4 + \frac{5}{x-2} \Rightarrow$ **ÇK(SS) = ?**

A) {−2} B) {2} C) {−2, 2}
D) {0} E) ∅

16. $x + \frac{5}{x} = 6 \Rightarrow$ **ÇK(SS) = ?**

A) {−1, −5} B) {1, 5} C) {−2, −3}
D) {2, 3} E) {−2, 3}

Yanıtlar / Answers

1. A	4. E	7. E	10. E	13. C	16. B
2. C	5. E	8. C	11. D	14. D	
3. C	6. B	9. E	12. A	15. A	

1. $x^2 + 2x - 35 = 0$

$$\begin{array}{cc} x & +7 \\ x & -5 \\ \hline \multicolumn{2}{c}{7x - 5x = 2x} \end{array}$$

$(x+7)\cdot(x-5)=0$

$x+7=0$ veya (or) $x-5=0$

$x=-7$ $x=5$

$ÇK(SS)=\{-7,5\}$

Yanıt / Answer A

---

2. $9x^2 - 10x + 1 = 0$

$$\begin{array}{cc} 9x & -1 \\ x & -1 \\ \hline \multicolumn{2}{c}{-9x - x = -10x} \end{array}$$

$(9x-1)\cdot(x-1)=0$

$9x-1=0$ veya (or) $x-1=0$

$9x=1$ $x=1$

$x=\frac{1}{9}$

$ÇK(SS)=\left\{\frac{1}{9},1\right\}$

Yanıt / Answer C

---

3. $4x^2 - 12x + 9 = 0$

$$\begin{array}{cc} 2x & -3 \\ 2x & -3 \\ \hline \multicolumn{2}{c}{-6x - 6x = -12x} \end{array}$$

$(2x-3)\cdot(2x-3)=0$

$2x-3=0$

$x=\frac{3}{2}$

$ÇK(SS)=\left\{\frac{3}{2}\right\}$

Yanıt / Answer C

---

4. $2x^2+4x-5=0$

$\Delta=b^2-4ac$

$\Delta=4^2-4\cdot2\cdot(-5)$

$\Delta=16+40=56$

Yanıt / Answer E

---

5. $4x^2-3x+1=0$

$\Delta=b^2-4ac$

$\Delta=(-3)^2-4\cdot4\cdot1$

$\Delta=-7 \Rightarrow \Delta=-7<0 \Rightarrow ÇK(SS)=\varnothing$

Yanıt / Answer E

---

6. $2x^3 - 9x^2 + 4x = 0$

$x(2x^2 - 9x + 4) = 0)$

$x\cdot(2x-1)\cdot(x-4)=0$

$x=0$ veya (or) $2x-1=0$ veya (or) $x-4=0$

$x=0$ $x=\frac{1}{2}$ $x=4$

$ÇK(SS)=\left\{0,\frac{1}{2},4\right\}$

Yanıt / Answer B

---

7. $5x^2-7x=0$

$x(5x-7)=0$

$x=0$ veya (or) $5x-7=0$

$x=\frac{7}{5}$

$ÇK(SS)=\left\{0,\frac{7}{5}\right\}$

Yanıt / Answer E

---

8. $4x^2-9=0$

$(2x-3)\cdot(2x+3)=0$

$2x-3=0$ veya (or) $2x+3=0$

$x=\frac{3}{2}$ $x=-\frac{3}{2}$

$ÇK(SS)=\left\{-\frac{3}{2},\frac{3}{2}\right\}$

Yanıt / Answer C

9. $3x^2 - 12 = 0$

$3(x^2 - 4) = 0$

$x^2 - 4 = 0$

$x^2 = 4$

$x = 2$ veya (or) $x = -2$

$ÇK(SS) = \{-2, 2\}$

Yanıt / Answer E

10. $2x^2 + 8 = 0$

$\Delta = b^2 - 4ac$

$\Delta = 0^2 - 4\cdot 2\cdot 8$

$\Delta = -64 < 0 \Rightarrow ÇK(SS) = \varnothing$

Yanıt / Answer E

11. $x^2 - 2x - 4 = 0$

$\Delta = b^2 - 4ac$

$\Delta = (-2)^2 - 4\cdot 1(-4)$

$\Delta = 20$

$$x_1 = \frac{-b+\sqrt{\Delta}}{2a} = \frac{2+2\sqrt{5}}{2} = 1+\sqrt{5}$$

$$x_2 = \frac{-b-\sqrt{\Delta}}{2a} = \frac{2-2\sqrt{5}}{2} = 1-\sqrt{5}$$

$ÇK(SS) = \left\{1+\sqrt{5}, 1-\sqrt{5}\right\}$

Yanıt / Answer D

12. $x^2 + 2x - 6 = 0$

$\Delta = b^2 - 4ac$

$\Delta = 2^2 - 4\cdot 1\cdot (-6)$

$\Delta = 28$

$$x_1 = \frac{-b+\sqrt{\Delta}}{2a} = \frac{-2+2\sqrt{7}}{2} = -1+\sqrt{7}$$

$$x_2 = \frac{-b-\sqrt{\Delta}}{2a} = \frac{-2-2\sqrt{7}}{2} = -1-\sqrt{7}$$

$ÇK(SS) = \left\{-1 \pm \sqrt{7}\right\}$

Yanıt / Answer A

13. $(m^2 - 4)x^2 - mx - 2m^2 + m + 7 = 0$

$x_1 = -1 \Rightarrow (m^2 - 4)\cdot(-1)^2 - m(-1) - 2m^2 + m + 7 = 0$

$m^2 - 4 + m - 2m^2 + m + 7 = 0$

$-m^2 + 2m + 3 = 0$

$$\begin{array}{ll} -m & 3 \\ m & 1 \\ \hline \multicolumn{2}{l}{3m - m = 2m} \end{array}$$

$(-m + 3)\cdot(m + 1) = 0$

$-m + 3 = 0$ veya (or) $m + 1 = 0$

$m = 3$ $\quad m = -1$

$m \in R^+ \Rightarrow m = 3$

Yanıt / Answer C

14. $mx^2 - (m + 3)x + m - 5 = 0$

$x_1 = x_2 \Rightarrow \Delta = 0$

$\Delta = b^2 - 4ac$

$[-(m + 3)]^2 - 4\cdot m\cdot(m - 5) = 0$

$m^2 + 6m + 9 - 4m^2 + 20m = 0$

$3m^2 - 26m - 9 = 0$

$$\begin{array}{ll} 3m & +1 \\ m & -9 \\ \hline \multicolumn{2}{l}{-27m + m = -26m} \end{array}$$

$(3m + 1)\cdot(m - 9) = 0$

$3m + 1 = 0$ veya (or) $m - 9 = 0$

$m = -\frac{1}{3}$ $\quad m = 9$

$m \in Z^+ \Rightarrow m = 9$

Yanıt / Answer D

15. $$\frac{5}{x-2} + x^2 = 4 + \frac{5}{x-2}$$

$x^2 = 4$

$x = 2$ veya (or) $x = -2$

$x - 2 \neq 0 \Rightarrow x \neq 2$

$ÇK(SS) = \{-2\}$

Yanıt / Answer A

16. $x + \frac{5}{x} = 6 \Rightarrow x^2 + 5 = 6x$

$x^2 - 6x + 5 = 0$

$$\begin{array}{ll} x & -5 \\ x & -1 \\ \hline \multicolumn{2}{l}{-5x - x = -6x} \end{array}$$

$(x - 5)\cdot(x - 1) = 0$

$x - 5 = 0$ veya (or) $x - 1 = 0$

$x = 5$ $\quad x = 1$

$ÇK(SS) = \{1, 5\}$

Yanıt / Answer B

1. $x^2 - 4x - 3 = 0$,

ÇK(SS) = $\{x_1, x_2\}$ ⇒ $\mathbf{(x_1 + x_2) \cdot (x_1 \cdot x_2) = ?}$

A) −12 B) −6 C) −3 D) 6 E) 12

2. $(m + 1)x^2 - (m + 3)x + 7 = 0$, ÇK(SS) = $\{x_1, x_2\}$

$x_1 + x_2 = \dfrac{2}{3}$ ⇒ **m = ?**

A) −9 B) −7 C) 5 D) 7 E) 9

3. $mx^2 + (2m - 1)x + 3m - 4 = 0$,

ÇK(SS) = $\{x_1, x_2\}$

$x_1 \cdot x_2 = -1$ ⇒ **m = ?**

A) −8 B) −6 C) 1 D) 6 E) 8

4. $m \in R^+$

$x^2 + (m - 3)x - 3m = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1^2 + x_2^2 = 13$ ⇒ **m = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

5. $x^4 - 6x^2 + 8 = 0$ ⇒ **ÇK(SS) = ?**

A) $\{\sqrt{2}, 2\}$ B) $\{\mp\sqrt{2}\}$ C) $\{\mp 2\}$

D) $\{\mp\sqrt{2}, \mp 2\}$ E) $\varnothing$

6. $3\left(\dfrac{x}{3}+1\right)^2 - 7\left(\dfrac{x}{3}+1\right) + 2 = 0$

A) {−3, 2} B) {−2, 3} C) {−3, −2}

D) {2, 3} E) {5}

7. $2x^2 - x - 3 = 0$, ÇK(SS) = $\{x_1, x_2\}$ ⇒ $\mathbf{\dfrac{x_1^2 + x_2^2}{x_1 \cdot x_2} = ?}$

A) $-\dfrac{15}{4}$ B) $-\dfrac{13}{6}$ C) $\dfrac{5}{3}$ D) $\dfrac{5}{3}$ E) $\dfrac{11}{6}$

8. $3x^2 - 5x - 6 = 0$, ÇK(SS) = $\{x_1, x_2\}$

⇒ $\mathbf{3x_1 + 3x_2 - x_1 \cdot x_2 = ?}$

A) 3 B) 5 C) 6 D) 7 E) 9

9. $x^2 - 2(m+1)x + 2m + 1 = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$\sqrt{x_1 \cdot x_2} = 3$

$\Rightarrow$ **$x_1 + x_2 = ?$**

A) –8 B) –5 C) 5 D) 8 E) 10

10. $2mx^2 - mx - 3 = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1^2 x_2 + x_1 \cdot x_2^2 = -6 \Rightarrow$ **m = ?**

A) $\frac{1}{16}$ B) $\frac{1}{12}$ C) $\frac{1}{8}$ D) $\frac{1}{6}$ E) $\frac{1}{4}$

11. $mx^2 - (m+1)x - 3 = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1 + x_2 = 4 \Rightarrow$ **m = ?**

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{1}{4}$ D) 1 E) 2

12. $x^2 - (m-1)x + m + 2 = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1 \cdot x_2 = -1$

$\Rightarrow$ **$x_1 + x_2 = ?$**

A) –4 B) –3 C) –2 D) –1 E) 0

13. $x^2 - 3x + 2m - 5 = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1^2 + x_2^2 = 39 \Rightarrow$ **m = ?**

A) –9 B) –8 C) –7 D) –5 E) –3

14. $x^2 - 2x + m = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$2x_1 + x_2 = 6 \Rightarrow$ **m = ?**

A) –10 B) –8 C) –6 D) 6 E) 8

15. $x^2 - 6x + m - 1 = 0$, ÇK(SS) = $\{x_1, x_2\}$,

$x_1 = 2x_2 \Rightarrow$ **m = ?**

A) 7 B) 8 C) 9 D) 10 E) 11

16. $x_1 = -3$, $x_2 = 5$, ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow$ **$x^2 + bx + c = ?$**

A) $x^2 - 2x - 15 = 0$ B) $x^2 + 2x - 15 = 0$

C) $x^2 - 2x + 15 = 0$ D) $x^2 + 2x + 15 = 0$

E) $x^2 + 2x = 0$

Yanıtlar / Answers

1. A	4. B	7. B	10. C	13. D	16. A
2. B	5. D	8. D	11. B	14. B	
3. C	6. B	9. E	12. A	15. C	

1. $x^2-4x-3=0$

$$(x_1+x_2)\cdot(x_1\cdot x_2)=\left(-\frac{b}{a}\right)\cdot\frac{c}{a}$$
$$=4\cdot(-3)=-12$$

Yanıt / Answer A

2. $(m+1)x^2-(m+3)x+7=0$

$$x_1+x_2=-\frac{b}{a}=\frac{2}{3}$$
$$\frac{-(-(m+3))}{m+1}=\frac{2}{3}$$
$$3m+9=2m+2$$
$$m=-7$$

Yanıt / Answer B

3. $mx^2+(2m-1)x+3m-4=0$

$$x_1\cdot x_2=\frac{c}{a}=-1$$
$$\frac{3m-4}{m}=-1$$
$$3m-4=-m$$
$$m=1$$

Yanıt / Answer C

4. $x^2+(m-3)x-3m=0$

$$x_1^2+x_2^2=(x_1+x_2)^2-2x_1\cdot x_2$$
$$x_1^2+x_2^2=\left(-\frac{b}{a}\right)^2-2\cdot\frac{c}{a}$$
$$13=(m-3)^2-2\cdot(-3m)$$
$$13=m^2-6m+9+6m$$
$$4=m^2 \Rightarrow m=\pm 2$$
$$m\in R^+ \Rightarrow m=2$$

Yanıt / Answer B

5. $x^4-6x^2+8\ 0$

$$x^2=t \Rightarrow t^2-6t+8=0$$
$$\begin{array}{ccc} t & \times & -4 \\ t & & -2 \\ \hline \multicolumn{3}{c}{-4t-2t=-6t} \end{array}$$

$$(t-4)\cdot(t-2)=0$$
$t-4=0$ veya (or) $t-2=0$

$t=4$ $\qquad t=2$

$\Rightarrow x^2=4$ $\qquad \Rightarrow x^2=2$

$x=\pm 2$ $\qquad x=\pm\sqrt{2}$

$ÇK(SS)=\{\pm\sqrt{2},\pm 2\}$

Yanıt / Answer D

6. $3\left(\frac{x}{3}+1\right)^2-7\left(\frac{x}{3}+1\right)+2=0$

$$\frac{x}{3}+1=t$$
$$3t^2-7t+2=0$$
$$\begin{array}{ccc} 3t & \times & -1 \\ t & & -2 \\ \hline \multicolumn{3}{c}{-6t-t=-7t} \end{array}$$
$$(3t-1)\cdot(t-2)=0$$
$3t-1=0$ veya (or) $t-2=0$

$t=\frac{1}{3}$ $\qquad t=2$

$\frac{x}{3}+1=\frac{1}{3}$ $\qquad \frac{x}{3}+1=2$

$x=-2$ $\qquad x=3$

$ÇK(SS)=\{-2,3\}$

Yanıt / Answer B

7. $2x^2-x-3=0$

$$\frac{x_1^2+x_2^2}{x_1\cdot x_2}=\frac{(x_1+x_2)^2-2x_1\cdot x_2}{x_1\cdot x_2}=\frac{(x_1+x_2)^2}{x_1\cdot x_2}-2$$
$$=\frac{\left(\frac{1}{2}\right)^2}{\left(-\frac{3}{2}\right)}-2=-\frac{13}{6}$$

Yanıt / Answer B

8. $3x^2-5x-6=0$

$3x_1+3x_2-x_1\cdot x_2=3(x_1+x_2)-x_1\cdot x_2$

$=3\cdot\frac{5}{3}-\frac{(-6)}{3}=7$

Yanıt / Answer D

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9. $x^2-2(m+1)x+2m+1=0$

$\sqrt{x_1\cdot x_2}=3 \Rightarrow x_1\cdot x_2=9$

$2m+1=9 \Rightarrow m=4$

$\Rightarrow x_1+x_2=2(m+1)$

$=2\cdot(4+1)=10$

Yanıt / Answer E

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10. $2mx^2-mx-3=0$

$x_1^2\cdot x_2+x_1\cdot x_2^2=-6$

$x_1\cdot x_2(x_1+x_2)=-6$

$\left(-\frac{3}{2m}\right)\cdot\left(\frac{m}{2m}\right)=-6$

$1=8m \Rightarrow m=\frac{1}{8}$

Yanıt / Answer C

---

11. $mx^2-(m+1)x-3=0$

$x_1+x_2=-\frac{b}{a}=4$

$\frac{m+1}{m}=4$

$m+1=4m \Rightarrow m=\frac{1}{3}$

Yanıt / Answer B

---

12. $x^2-(m-1)x+m+2=0$

$x_1\cdot x_2=\frac{c}{a}=-1$

$m+2=-1 \Rightarrow m=-3$

$\Rightarrow x_1+x_2=-\frac{b}{a}$

$=m-1=-4$

Yanıt / Answer A

---

13. $x^2-3x+2m-5=0$

$x_1^2+x_2^2=39$

$(x_1+x_2)^2-2x_1\cdot x_2=39$

$3^2-2(2m-5)=39$

$2m-5=-15$

$2m=-10 \Rightarrow m=-5$

Yanıt / Answer D

---

14. $x^2-2x+m=0$

$2x_1+x_2=6$

$x_1+(x_1+x_2)=6$

$x_1+2=6$

$x_1=4$

$\Rightarrow 4^2-2\cdot 4+m=0$

$m=-8$

Yanıt / Answer B

---

15. $x^2-6x+m-1=0$

$x_1+x_2=6$

$x_1=2x_2 \Rightarrow 2x_2+x_2=6$

$x_2=2$

$\Rightarrow 2^2-6\cdot 2+m-1=0$

$m=9$

Yanıt / Answer C

---

16. $x_1=-3, \quad x_2=5$

$(x-x_1)\cdot(x-x_2)=0$

$(x+3)\cdot(x-5)=0$

$x^2-2x-15=0$

Yanıt / Answer A

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1. $6x^2 - 7x - 5 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{-\frac{1}{2}, \frac{5}{3}\right\}$ B) $\left\{\frac{1}{2}, \frac{5}{3}\right\}$ C) $\left\{-\frac{5}{3}, \frac{1}{2}\right\}$

D) $\{-3, 2\}$ E) $\left\{-3, -\frac{1}{2}\right\}$

2. $x^2 + mx + n = 0$, ÇK(SS) = $\{x_1, x_2\}$

$x_1 = -3$,

$m - n = 1$

$\Rightarrow$ **$m^2 + n^2 = ?$**

A) 25 B) 32 C) 40 D) 61 E) 72

3. $2x^2 - 3x + m = 0$, ÇK(SS) = $\{x_1, x_2\}$

$x_1 = -2 \Rightarrow$ **$x_2 = ?$**

A) $\frac{1}{2}$ B) $\frac{3}{2}$ C) $\frac{5}{2}$ D) $\frac{7}{2}$ E) $\frac{9}{2}$

4. $\sqrt{2x-1} = x - 2 \Rightarrow$ **ÇK(SS) = ?**

A) {1, 5} B) {5} C) {–1, 3}

D) {3} E) {–5}

5. $3^{2x+1} - 10\cdot 3^x + 3 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) {–1} B) {1} C) {–1, 1}

D) {–1, 2} E) {1, 2}

6. $x - \frac{6}{x} = 5 \Rightarrow$ **ÇK(SS) = ?**

A) {–2, 3} B) {–3, 2} C) {6, 1}

D) {–6, 1} E) {–1, 6}

7. $x^2 - |x| - 6 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) {–3, 3} B) {–3, –2, 3} C) {–3,–2, 2,3}

D) {–2, 2} E) {2, 3}

8. $x^2 + (m - 1)x + m - 2 = 0$, ÇK(SS) = $\{x_1, x_2\}$

$x_1 = x_2 \Rightarrow$ **m = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

9. $(x^2+2x)^2-13(x^2+2x)+30=0,$

ÇK(SS) = $\{x_1, x_2, x_3, x_4\}$ $\Rightarrow$ $\mathbf{x_1+x_2+x_3+x_4=?}$

A) –6 B) –4 C) –2 D) 2 E) 4

10. $\dfrac{x+2}{x-1}=\dfrac{3}{x^2-x}+\dfrac{1}{x}$, ÇK(SS) = $\{x_1,x_2\}$ $\Rightarrow$ $\mathbf{x_1+x_2=?}$

A) –2 B) –1 C) 0 D) 1 E) 2

11. $\dfrac{2}{x}+\dfrac{m}{x-1}-2=0$, ÇK(SS) = $\{x_1,x_2\}$

$x_1+x_2=\dfrac{5}{2}$ $\Rightarrow$ $\mathbf{m=?}$

A) –3 B) –2 C) –1 D) 1 E) 2

12. $2x^2-4x+3m-6=0$, ÇK(SS) = $\{x_1, x_2\}$

$2x_1-3x_2=-6$

$\Rightarrow$ **m = ?**

A) –2 B) –1 C) 0 D) 1 E) 2

13. $mx^2-x+n=0$, ÇK(SS) = $\{x_1, x_2\}$

$x_1^{-1}+x_2^{-1}=\dfrac{1}{2}$

$\Rightarrow$ **n = ?**

A) –2 B) –1 C) 1 D) 2 E) 3

14. $x^2-(m-1)x+(m-2)=0$, ÇK(SS) = $\{x_1, x_2\}$

$x_1=2x_2-5$

$\Rightarrow$ $\mathbf{\prod m=?}$

A) –5 B) –4 C) –3 D) –2 E) –1

15. $m>0$

$m-\dfrac{6}{m}=1$

$\Rightarrow$ $\mathbf{m=?}$

A) 1 B) 2 C) 3

D) 4 E) 5

[YTÜ. YÖS 2013]

Yanıtlar / *Answers*

1. A	4. B	7. A	10. B	13. D
2. A	5. C	8. C	11. D	14. A
3. D	6. E	9. B	12. E	15. C

1. $6x^2-7x-5=0$

$3x \quad -5$

$2x \quad 1$

$-10x+3x=-7x$

$(3x-5)\cdot(2x+1)=0$

$3x-5=0$ veya (or) $2x+1=0$

$x=\frac{5}{3}$ $\qquad x=-\frac{1}{2}$

$ÇK(SS)=\left\{-\frac{1}{2},\frac{5}{3}\right\}$

Yanıt / Answer A

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2. $x^2+mx+n=0$

$x_1=-3 \Rightarrow (-3)^2+m(-3)+n=0$

$-3m+n=-9$

$+ \quad m-n=1$

$-2m=-8 \Rightarrow m=4$

$m-n=1$

$4-n=1 \Rightarrow n=3$

$\Rightarrow m^2+n^2=4^2+3^2=25$

Yanıt / Answer A

---

3. $2x^2-3x+m=0$

$x_1+x_2=-\frac{b}{a}$

$-2+x_2=\frac{3}{2}$

$x_2=\frac{7}{2}$

Yanıt / Answer D

---

4. $\sqrt{2x-1}=x-2$

$2x-1=x^2-4x+4$

$x^2-6x+5=0$

$x \quad -5$

$x \quad -1$

$-5x-x=-6x$

$(x-5)\cdot(x-1)=0$

$x-5=0$ veya (or) $x-1=0$

$x=5$ $\qquad x=1$

$\sqrt{2x-1}=x-2 \Rightarrow \sqrt{2\cdot 1-1}\neq 1-2$

$ÇK(SS)=\{5\}$

Yanıt / Answer B

---

5. $3^{2x+1}-10\cdot 3^x+3=0 \qquad 3^x=t$

$3^{2x}\cdot 3-10\cdot 3^x+3=0$

$3t^2-10t+3=0$

$3t \quad -1$

$t \quad -3$

$-9t-t=-10t$

$(3t-1)\cdot(t-3)=0$

$3t-1=0$ veya (or) $t-3=0$

$t=\frac{1}{3}$ $\qquad t=3$

$\Rightarrow 3^x=\frac{1}{3}$ $\qquad \Rightarrow 3^x=3$

$x=-1$ $\qquad x=1$

$ÇK(SS)=\{-1,1\}$

Yanıt / Answer C

---

6. $x-\frac{6}{x}=5$

$x^2-6=5x$

$x^2-5x-6=0$

$x \quad -6$

$x \quad 1$

$(x-6)\cdot(x+1)=0$

$x-6=0$ veya (or) $x+1=0$

$x=6$ $\qquad x=-1$

$ÇK(SS)=\{-1, 6\}$

Yanıt / Answer E

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7. $x^2-|x|-6=0$

$x>0$: $x^2-x-6=0$

$x-3=0$ veya (or) $x+2=0$

$x=3$ $\qquad x=-2$ $\qquad x>0 \Rightarrow x=3$

$x<0$: $x^2+x-6=0$

$(x+3)\cdot(x-2)=0$

$x+3=0$ veya (or) $x-2=0$

$x=-3$ $\qquad x=2$

$x<0 \Rightarrow x=-3$

$ÇK(SS)=\{-3, 3\}$

Yanıt / Answer A

---

8. $x^2+(m-1)x+m-2=0$

$x_1=x_2 \Rightarrow \Delta=0$

$\Delta=b^2-4\cdot ac$

$(m-1)^2-4\cdot(m-2)\cdot 1=0$

$m^2-2m+1-4m+8=0$

$m^2-6m+9=0$

$(m-3)^2=0 \Rightarrow m=3$

Yanıt / Answer C

9. $(x^2+2x)^2-13(x^2+2x)+30=0$

$x^2+2x=t$

$\Rightarrow t^2-13t+30=0$

$t \quad -10$

$t \quad -3$

$(t-10)\cdot(t-3)=0$

$t-10=0$ veya (or) $t-3=0$

$t=10 \qquad t=3$

$\Rightarrow x^2+2x=10 \qquad x^2+2x=3$

$x^2+2x-10=0 \qquad x^2+2x-3=0$

$x_1+x_2=\dfrac{-b}{a}=-2 \qquad x_3+x_4=\dfrac{-b}{a}=-2$

$\Rightarrow x_1+x_2+x_3+x_4=-4$

Yanıt / Answer B

10. $\dfrac{x+2}{x-1}=\dfrac{3}{x^2-x}+\dfrac{1}{x}$

$\dfrac{x+2}{\underset{(x)}{x-1}}=\dfrac{3}{\underset{(1)}{x(x-1)}}+\dfrac{1}{\underset{(x-1)}{x}}$

$\dfrac{x^2+2x}{x(x-1)}=\dfrac{3}{x(x-1)}+\dfrac{x-1}{x(x-1)}$

$x^2+2x=3+x-1$

$x^2+x-2=0$

$x_1+x_2=\dfrac{-b}{a}=-1$

Yanıt / Answer B

11. $\dfrac{2}{\underset{(x-1)}{x}}+\dfrac{m}{\underset{(x)}{x-1}}-\dfrac{2}{\underset{x(x-1)}{1}}=0$

$\dfrac{2(x-1)+m\cdot x-2\cdot x(x-1)}{x(x-1)}=0$

$2x-2+mx-2x^2+2x=0$

$2x^2-(4+m)x-2=0$

$x_1+x_2=-\dfrac{b}{a}=\dfrac{5}{2}$

$\dfrac{4+m}{2}=\dfrac{5}{2} \Rightarrow m=1$

Yanıt / Answer D

12. $2x^2-4x+3m-6=0$

$x_1+x_2=-\dfrac{b}{a}=2$

$2x_1-3x_2=-6$

$3/ \quad x_1+x_2=2$

$5x_1=0 \Rightarrow x_1=0$

$x_1=0 \Rightarrow 2\cdot 0^2-4\cdot 0+3m-6=0$

$3m=6 \Rightarrow m=2$

Yanıt / Answer E

13. $mx^2-x+n=0$

$x_1^{-1}+x_2^{-1}=\dfrac{1}{2}$

$\dfrac{1}{\underset{(x_2)}{x_1}}+\dfrac{1}{\underset{(x_1)}{x_2}}=\dfrac{1}{2} \Rightarrow \dfrac{x_1+x_2}{x_1\cdot x_2}=\dfrac{1}{2}$

$\dfrac{\frac{1}{m}}{\frac{n}{m}}=\dfrac{1}{2} \Rightarrow \dfrac{1}{n}=\dfrac{1}{2} \Rightarrow n=2$

Yanıt / Answer D

14. $x^2-(m-1)x+(m-2)=0$

$x_1+x_2=-\dfrac{b}{a}$

$2x_2-5+x_2=m-1$

$3x_2=m+4 \Rightarrow x_2=\dfrac{m+4}{3}$

$\Rightarrow \left(\dfrac{m+4}{3}\right)^2-(m-1)\cdot\left(\dfrac{m+4}{3}\right)+(m-2)=0$

$\dfrac{m^2+8m+16+3m^2-9m+12+9m-18}{9}=0$

$-2m^2+8m+10=0$

$m^2-13m-5=0$

$m_1\cdot m_2=\dfrac{c}{a}=-5$

Yanıt / Answer A

15. $m>0$

$m-\dfrac{6}{m}=1 \Rightarrow m^2-m-6=0$

$(m-3)(m+2)=0$

$m_1=3, \quad m_2=-2$

$m>0 \Rightarrow m=3$

Yanıt / Answer C

İKİNCİ DERECEDEN EŞİTSİZLİKLER
QUADRATIC INEQUALITIES

BÖLÜM
CHAPTER
3

İkinci Dereceden Eşitsizlikler / Quadratic Inequalities

Test 1

1. $3(x-2) \leq 2x + 5 \Rightarrow$ **ÇK(SS) = ?**

A) $(-\infty, -1]$ B) $(-\infty, -11)$ C) $(-\infty, 11]$ D) $[1, \infty)$ E) $[11, \infty)$

2. $x^2 - 5x + 6 \leq 0 \Rightarrow$ **ÇK(SS) = ?**

A) $[-3, -2]$ B) $[-3, 2]$ C) $(-3, -2)$ D) $[1, 6]$ E) $[2, 3]$

3. $x^2 + x - 12 < 0 \Rightarrow$ **ÇK(SS) = ?**

A) $(-4, 3)$ B) $(-3, 4)$ C) $(-2, 6)$ D) $(-6, 2)$ E) $(-4, -3)$

4. $x^2 - 2x - 8 \geq 0 \Rightarrow$ **ÇK(SS) = ?**

A) $(-\infty, -2]$ B) $[-4, -2]$ C) $[4, \infty)$ D) $(-\infty, \infty)$ E) $(-\infty, -2] \cup [4, \infty)$

5. $x \in Z$,

$-x^2 + 4x + 5 \geq 0 \Rightarrow$ **$\sum x$ = ?**

A) 10 B) 11 C) 12 D) 13 E) 14

6. $x \in Z$,

$x^2 - x \geq 6 \Rightarrow$ **$\sum x$ = ?**

A) –3 B) –2 C) –1 D) 2 E) 3

7. $m \in Z, \forall x \in R,$

$f(x) = x^2 - (m-2)x + 10,$

$f(x) > 1 \Rightarrow \sum m = ?$

A) 20 B) 21 C) 22 D) 23 E) 24

8. $x^2 - 2x - 5 + m = 0, m \in Z,$

$x_1 \neq x_2,$

$ÇK(SS) = \{x_1, x_2\}$

$\Rightarrow$ **max(m) = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

9. $x^2 - 2mx + 6 - m = 0, \; m \in Z,$

$ÇK(SS) = \varnothing \Rightarrow$ **min(m) = ?**

A) –3 B) –2 C) –1 D) 1 E) 3

10. $x \in Z,$

$(4 + x)\cdot(2x - 7) \leq 0 \Rightarrow \sum x = ?$

A) –4 B) –3 C) –2 D) –1 E) 0

11. $x \in Z$

$$\frac{x^2-4x+3}{x^2+6x+9} \leq 0 \Rightarrow \sum x = ?$$

A) 3 B) 5 C) 6 D) 9 E) 12

12. $x \in N$

$$\frac{x(x^2-4)}{x^2-2x-15} \leq 0 \Rightarrow \sum x = ?$$

A) 9 B) 10 C) 12 D) 13 E) 14

Yanıtlar / Answers

1. C	4. E	7. C	10. A
2. E	5. E	8. E	11. C
3. A	6. B	9. B	12. A

1. $3(x-2) \le 2x+5$

$3x-6 \le 2x+5$

$3x-2x \le 5+6$

$x \le 11$

ÇK(SS) = $(-\infty, 11]$

Yanıt / Answer C

---

2. $x^2-5x+6 \le 0$

$x^2-5x+6=0$

$x \quad -3$

$x \quad -2$

$(x-3)\cdot(x-2)=0$

$x-3=0$ veya (or) $x-2=0$

$x=3$ $x=2$

x	$-\infty$		2		3		$+\infty$
x^2-5x+6		+	●	−	●	+	

ÇK(SS) = $[2, 3]$

Yanıt / Answer E

---

3. $x^2+x-12<0$

$x^2+x-12=0$

$x \quad +4$

$x \quad -3$

$(x+4)\cdot(x-3)=0$

$x+4=0$ veya (or) $x-3=0$

$x=-4$ $x=3$

x	$-\infty$		−4		3		$+\infty$
x^2+x-12		+	○	−	○	+	

ÇK(SS) = $(-4, 3)$

Yanıt / Answer A

---

4. $x^2-2x-8 \ge 0$

$x^2-2x-8=0$

$(x-4)\cdot(x+2)$

$x-4=0$ veya (or) $x+2=0$

$x=4$ $x=-2$

x	$-\infty$		−2		4		$+\infty$
x^2-2x-8		+	●	−	●	+	

ÇK(SS) = $(-\infty, -2] \cup [4, \infty)$

Yanıt / Answer E

---

5. $-x^2+4x+5 \ge 0$

$x^2-4x-5 \le 0$

$x^2-4x-5=0$

$(x-5)\cdot(x+1)=0$

$x-5=0$ veya (or) $x+1=0$

$x=5$ $x=-1$

x	$-\infty$		−1		5		$+\infty$
$-x^2+4x+5$		+	●	−	●	+	

$-1 \le x \le 5$

$\Rightarrow \sum x = (-1)+0+1+2+3+4+5=14$

Yanıt / Answer E

---

6. $x^2-x \ge 6 \Rightarrow x^2-x-6 \ge 0$

$x^2-x-6=0$

$x \quad -3$

$x \quad 2$

$(x-3)\cdot(x+2)=0$

$x-3=0$ veya (or) $x+2=0$

$x=3$ $x=-2$

	$-\infty$		−2		3		$+\infty$
		+	●	−	●	+	

$\sum x = \ldots(-4)+(-3)+(-2)+3+4+\ldots=-2$

Yanıt / Answer B

7. $f(x) = x^2 - (m-2)x + 10$

$\forall x \in R,\ f(x) > 1$

$\Rightarrow\ x^2 - (m-2)x + 10 > 1$

$x^2 - (m-2)x + 9 > 0$

$\Rightarrow \Delta < 0 \ \Rightarrow\ b^2 - 4ac < 0$

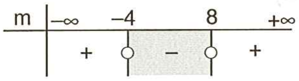
$(-(m-2))^2 - 4{\cdot}1{\cdot}9 < 0 \Rightarrow m^2 - 4m + 4 - 36 < 0$

$m^2 - 4m - 32 < 0 \ \Rightarrow\ m^2 - 4m - 32 = 0$

$(m-8){\cdot}(m+4) = 0$

$m - 8 = 0$ veya (or) $m + 4 = 0$

$m = 8$ $\qquad m = -4$



$-4 < m < 8$

$\Rightarrow \sum m = (-3) + (-2) + \ldots + 2 + 3 + 4 + \ldots + 7 = 22$

Yanıt / Answer C

---

8. $x^2 - 2x - 5 + m = 0 \ \Rightarrow\ x_1 \neq x_2 \ \Rightarrow\ \Delta > 0$

$b^2 - 4ac > 0 \ \Rightarrow\ (-2)^2 - 4{\cdot}1(m-5) > 0$

$4 - 4(m-5) > 0 \ \Rightarrow\ 4 - 4m + 20 > 0$

$24 > 4m \ \Rightarrow\ 6 > m \ \Rightarrow\ \max(m) = 5$

Yanıt / Answer E

---

9. $x^2 - 2mx + 6 - m = 0$

$ÇK(SS) = \varnothing \ \Rightarrow\ \Delta < 0$

$b^2 - 4ac < 0$

$(-2m)^2 - 4{\cdot}1(6-m) < 0$

$4m^2 - 4(6-m) < 0 \ \Rightarrow\ m^2 + m - 6 < 0$

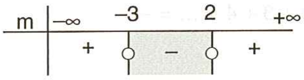
$m^2 + m - 6 = 0$

$m \quad +3$

$m \quad -2$

$(m+3){\cdot}(m-2) = 0 \ \Rightarrow\ m+3=0$ veya (or) $m-2=0$

$m=-3$ $\qquad m=2$



$-3 < m < 2 \ \Rightarrow\ \min(m) = -2$

Yanıt / Answer B

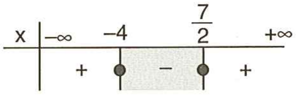
---

10. $(4+x)\cdot(2x-7) \leq 0$

$(4+x)\cdot(2x-7) = 0$

$4+x=0$ veya (or) $2x-7=0$

$x=-4$ $\qquad x=\dfrac{7}{2}$



$-4 \leq x \leq \dfrac{7}{2}$

$\Rightarrow \sum x = (-4) + (-3) + (-2) + (-1) + 0 + 1 + 2 + 3 = -4$

Yanıt / Answer A

---

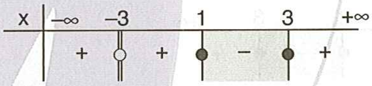
11. $\dfrac{x^2-4x+3}{x^2+6x+9} \leq 0$

$x^2-4x+3=0$ $\qquad x^2+6x+9=0$

$(x-3)(x-1)=0$ $\qquad (x+3)^2=0 \ \Rightarrow\ x=-3$

$x-3=0$ veya (or) $x-1=0$

$x=3$ $\qquad x=1$



$1 \leq x \leq 3 \ \Rightarrow\ \sum x = 1 + 2 + 3 = 6$

Yanıt / Answer C

---

12. $\dfrac{x(x^2-4)}{x^2-2x-15} \leq 0$

$x(x^2-4)=0 \ \Rightarrow\ x(x-2)\cdot(x+2)=0$

$x=0$ veya (or) $x-2=0$ veya (or) $x+2=0$

$x=2$ $\qquad x=-2$

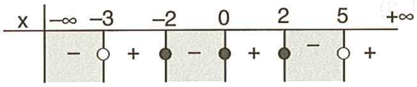
$x^2-2x-15=0$

$x \quad -5$

$x \quad +3$

$(x-5)(x+3)=0 \ \Rightarrow\ x-5=0$ veya (or) $x+3=0$

$x=5$ $\qquad x=-3$



$x \in N \Rightarrow 2 \leq x < 5 \Rightarrow \sum x = 9$

Yanıt / Answer A

1. $x \in Z$

$(2-x)^2 \cdot (x^2-16) < 0 \Rightarrow \sum x = ?$

A) –4 B) –2 C) 0 D) 2 E) 4

2. $\dfrac{(x-1)^3 \cdot (x+2)^2}{(x-3)} < 0 \Rightarrow$ **ÇK(SS) = ?**

A) $-\infty < x < 3$

B) $-\infty < x < +\infty$

C) $1 < x < \infty$

D) $1 < x < 3$

E) $-2 < x < \infty$

3. $\dfrac{x^3+x}{x+1} \le 1 \Rightarrow$ **ÇK(SS) = ?**

A) [–1, 1] B) (–1, 0] C) (–1, 1]

D) (–1, 1) E) [–1, 1)

4. $x \in Z$

$\dfrac{x^2+2x-3}{x^2} \le 0 \Rightarrow \sum x = ?$

A) –5 B) –2 C) 0 D) 2 E) 5

5. $\dfrac{(x+1)(x^2-2x-3)}{(2-x)} \ge 0 \Rightarrow$ **ÇK(SS) = ?**

A) (2, 3] B) (–1, 3] C) (2, 3)

D) [–1, 3] E) (2, 3] ∪ {–1}

6. $x \in N$

$\dfrac{1}{x} - \dfrac{2}{x-2} \ge 0 \Rightarrow$ **min(x) = ?**

A) 0 B) 1 C) 2 D) 3 E) 5

7. $x \in Z$

$$\frac{(x^2+2x+3)(x^2-4)}{(x-2)^2} \le 0 \Rightarrow \sum x = ?$$

A) –6 B) –5 C) –4 D) –2 E) –1

8. $x \in Z$

$$\frac{x^2-6x+5}{|x-2|} \le 0 \Rightarrow \sum x = ?$$

A) 9 B) 10 C) 11 D) 12 E) 13

9. $x \in Z$

$$\frac{|x-2|(x^2+2x-15)}{x^2+x+3} \le 0 \Rightarrow \sum x = ?$$

A) –12 B) –11 C) –10 D) –9 E) –7

10.

$$\left.\begin{aligned} x^2-x-12 &> 0 \\ x^2-3x-10 &< 0 \end{aligned}\right\} \Rightarrow \text{ÇK(SS)} = ?$$

A) (–3, –2) B) (–3, 4) C) (–2, 4) D) (–2, 5) E) (4, 5)

11.

$$\frac{8^x(x^2-9)}{x^2+4} \le 0 \Rightarrow \text{ÇK(SS)} = ?$$

A)[–3, 3] B) [–3, 8] C) [0, 3] D) [3, 8] E) [4, 8]

12. $x \in Z$

$$\frac{(x-1)^{1938}\cdot(x-5)^{1881}}{(x-9)^{1923}\cdot(x-2)^{1920}} \le 0 \Rightarrow \sum x = ?$$

A) 25 B) 26 C) 27 D) 28 E) 29

Yanıtlar / Answers

1. B	4. A	7. D	10. E
2. D	5. E	8. E	11. A
3. C	6. B	9. D	12. C

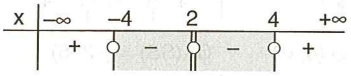
1. $(2-x)^2 \cdot (x^2-16) < 0$

$(2-x)^2 \cdot (x^2-16) = 0$

$(2-x)^2 = 0$ veya (or) $x^2 - 16 = 0$

$x_1 = 2, \quad x_2 = 2 \qquad (x-4)\cdot(x+4) = 0$

$x_3 = 4, \quad x_4 = -4$



ÇK(SS) = $(-4, 4) - \{2\}$

$\Rightarrow \sum x = -3 - 2 - 1 + 0 + 1 + 3 = -2$

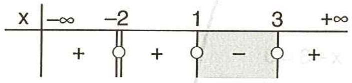
Yanıt / Answer B

---

2. $\dfrac{(x-1)^3(x+2)^2}{(x-3)} < 0$

$(x-1)^3 = 0$ veya (or) $(x+2)^2 = 0 \quad x - 3 = 0$

$x_1 = 1, \quad x_2 = -2, x_3 = -2, \quad x_4 = 3$



$\Rightarrow 1 < x < 3$

Yanıt / Answer D

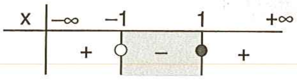
---

3. $\dfrac{x^3+x}{x+1} \le 1 \Rightarrow \underset{(1)}{\dfrac{x^3+x}{x+1}} - \underset{(x+1)}{\dfrac{1}{1}} \le 0$

$\dfrac{x^3+x-x-1}{x+1} \le 0 \Rightarrow \dfrac{x^3-1}{x+1} \le 0$

$x^3 - 1 = 0 \qquad x + 1 = 0$

$x = 1 \qquad x = -1$



ÇK(SS) = $(-1, 1]$

Yanıt / Answer C

---

4. $\dfrac{x^2+2x-3}{x^2} \le 0$

$x^2 + 2x - 3 = 0 \qquad x^2 = 0$

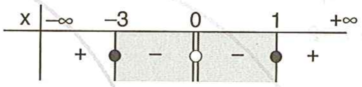
$x \quad +3 \qquad x_3 = 0, \; x_4 = 0$

$x \quad -1$

$(x+3)(x-1) = 0$

$x + 3 = 0$ veya(or) $x - 1 = 0$

$x_1 = -3 \qquad x_2 = 1$



ÇK(SS) = $[-3, 1] - \{0\}$

$\Rightarrow \sum x = (-3) + (-2) + (-1) + 1 = -5$

Yanıt / Answer A

---

5. $\dfrac{(x+1)(x^2-2x-3)}{(2-x)} \ge 0$

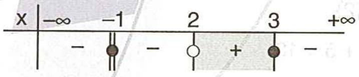
$(x+1)(x^2-2x-3) = 0 \qquad 2 - x = 0$

$(x+1)(x-3)(x+1) = 0 \qquad x = 2$

$(x-3)(x+1)^2 = 0$

$x - 3 = 0$ veya (or) $(x+1)^2 = 0$

$x_1 = 3 \qquad x_2 = -1, \; x_3 = -1$



ÇK(SS) = $(2, 3] \cup \{-1\}$

Yanıt / Answer E

---

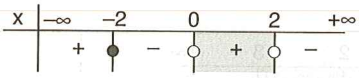
6. $\underset{(x-2)}{\dfrac{1}{x}} - \underset{(x)}{\dfrac{2}{x-2}} \ge 0 \Rightarrow \dfrac{x-2-2x}{x(x-2)} \ge 0$

$\dfrac{-2-x}{x(x-2)} \ge 0$

$-2 - x = 0 \qquad x(x-2) = 0$

$x = -2 \qquad x = 0$ veya (or) $x - 2 = 0$

$x = 2$



$x \in \mathbb{N} \Rightarrow 0 < x < 2 \Rightarrow \min(x) = 1$

Yanıt / Answer B

7. $\dfrac{(x^2+2x+3)(x^2-4)}{(x-2)^2} \le 0$

$x^2+2x+3=0 \Rightarrow \Delta = 4-4\cdot3\cdot1<0 \Rightarrow \text{ÇK(SS)}=\varnothing$

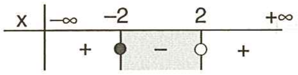
$x^2-4=0 \Rightarrow (x-2)(x+2)=0$

$x-2=0$ veya (or) $x+2=0$

$x_1=2 \qquad x_2=-2$

$(x-2)^2=0 \Rightarrow x-2=0$

$x_3=2,\ x_4=2$



$-2 \le x < 2 \Rightarrow \sum x = -2$

Yanıt / Answer D

8. $\dfrac{x^2-6x+5}{|x-2|} \le 0$

$x^2-6x+5 \le 0$

$x^2-6x+5=0$

$(x-5)(x-1)=0$

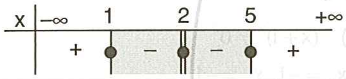
$x-5=0$ veya (or) $x-1=0$

$x=5 \qquad x=1$

$|x-2|=0$

$x-2=0 \qquad 2-x=0$

$x=2 \qquad x=2$



ÇK(SS) = [1, 5] − {2}

$\Rightarrow \sum x = 1+3+4+5 = 13$

Yanıt / Answer E

9. $\dfrac{|x-2|(x^2+2x-15)}{x^2+x+3} \le 0$

$|x-2|=0 \Rightarrow x-2=0 \qquad 2-x=0$

$x_1=2 \qquad x_2=2$

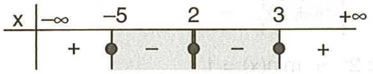
$x^2+2x-15=0$

$(x+5)(x-3)=0 \Rightarrow x+5=0$ veya (or) $x-3=0$

$x_3=-5 \qquad x_4=3$

$x^2+x+3=0 \Rightarrow \Delta = 1-4\cdot3 = -11<0$

$\Rightarrow \text{ÇK(SS)}=\varnothing$



$-5 \le x \le 3$

$\Rightarrow \sum x = (-5)+(-4)+(-3)+\ldots+3 = -9$

Yanıt / Answer D

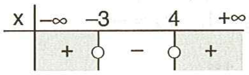
10. $x^2-x-12>0$

$x^2-x-12=0$

$(x-4)(x+3)=0$

$x-4=0\ ,\ x+3=0$

$x=4 \qquad x=-3$



ÇK(SS) = $(-\infty, -3) \cup (4, \infty)$

$\Rightarrow$ ÇK(SS) = (4, 5)

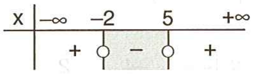
$x^2-3x-10<0$

$x^2-3x-10=0$

$(x-5)(x+2)=0$

$x-5=0\ ,\ x+2=0$

$x=5 \qquad x=-2$



ÇK(SS) = (−2, 5)

Yanıt / Answer E

11. $\dfrac{8^x\cdot(x^2-9)}{x^2+4} \le 0$

$8^x \ne 0 \Rightarrow \text{ÇK(SS)}=\varnothing$

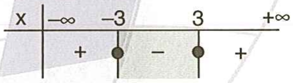
$x^2+4=0 \Rightarrow x^2=-4 \Rightarrow \text{ÇK(SS)}=\varnothing$

$x^2-9=0$

$(x-3)(x+3)=0$

$x-3=0$ veya (or) $x+3=0$

$x=3 \qquad x=-3$



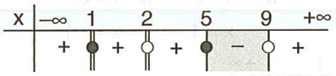
ÇK(SS) = [−3, 3]

Yanıt / Answer A

12. $\dfrac{(x-1)^{1938}\cdot(x-5)^{1881}}{(x-9)^{1923}\cdot(x-2)^{1920}} \le 0$

$x-1=0, \quad x-5=0, \quad x-9=0, \quad x-2=0$

$x=1 \qquad x=5 \qquad x=9 \qquad x=2$



ÇK(SS) = $[5, 9) \cup \{1\}$

$\Rightarrow \sum x = 5+6+7+8+1 = 27$

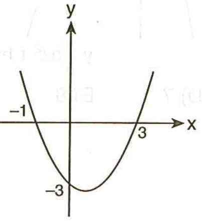
Yanıt / Answer C

İkinci Dereceden Fonksiyonlar / Quadratic Functions

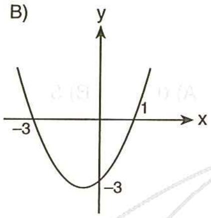
Test 1

1. $y = f(x) = x^2 - 2x - 3 \Rightarrow$ **f(x) = ?**

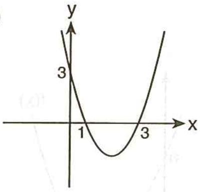
A)



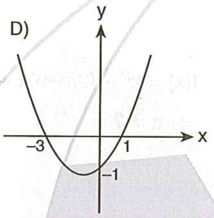
B)



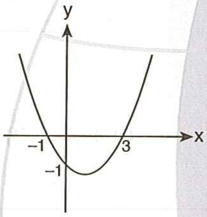
C)



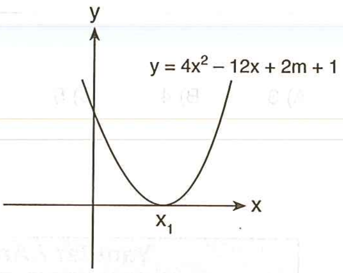
D)



E)

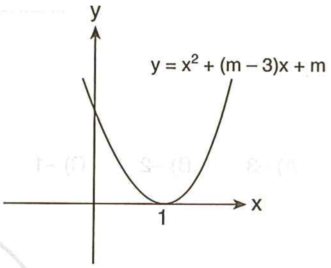


2. **m = ?**


y
y = 4x² – 12x + 2m + 1
x
x₁

A) 2 B) 3 C) 4 D) 5 E) 6

3. **m = ?**

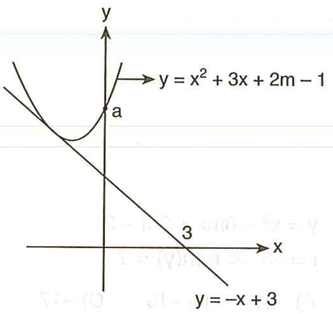

y
y = x² + (m – 3)x + m
x
1

A) 0 B) 1 C) 2 D) 3 E) 4

4. $f(x) = 3x^2 - 12x + 7 \Rightarrow$ **min(f(x)) = ?**

A) –5 B) –3 C) 1 D) 3 E) 5

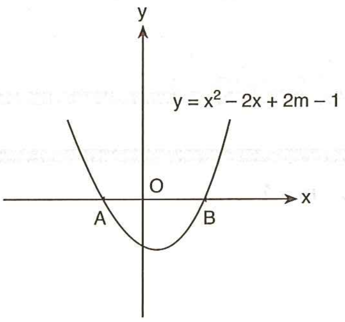
5. **a = ?**


y
y = x² + 3x + 2m – 1
a
3
x
y = –x + 3

A) 4 B) 5 C) 6 D) 7 E) 8

6. $|OB| = 3 \cdot |OA|$

$\Rightarrow$ **m = ?**


y
$y = x^2 - 2x + 2m - 1$
O
x
A
B

A) –3 B) –2 C) –1 D) 2 E) 3

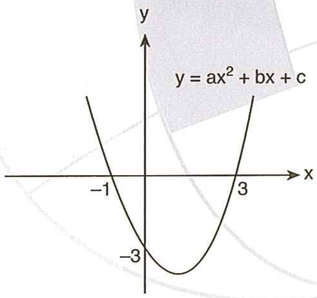
7. $y = f(x) = x^2 - 2x + m$,

A(3, –1)

$A \in f(x) \Rightarrow$ **m = ?**

A) –6 B) –5 C) –4 D) 4 E) 5

8. **a + b + c = ?**


y
$y = ax^2 + bx + c$
x
–1
3
–3

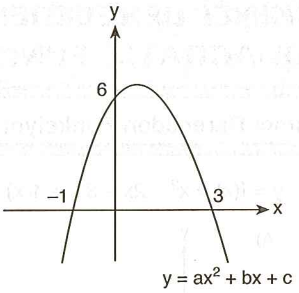
A) –5 B) –4 C) –3 D) 0 E) 3

9. $y = x^2 - 6mx + 3m - 2$

$r = -3 \Rightarrow$ **min(y) = ?**

A) –21 B) –19 C) –17 D) –14 E) –12

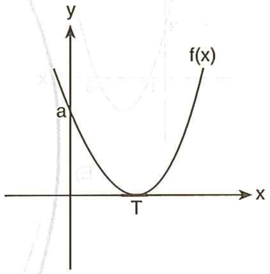
10. **a – b + c = ?**


y
6
–1
3
x
$y = ax^2 + bx + c$

A) 0 B) 5 C) 6 D) 7 E) 8

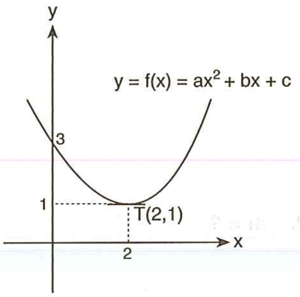
11. $f(x) = x^2 - (2m-6)x + m^2 - 21$

$\Rightarrow$ **a = ?**



A) 2 B) 3 C) 4 D) 5 E) 6

12. **f(4) = ?**


y
$y = f(x) = ax^2 + bx + c$
3
1
T(2,1)
2
x

A) 3 B) 4 C) 5 D) 6 E) 7

Yanıtlar / Answers

1. A	4. A	7. C	10. A
2. C	5. D	8. B	11. C
3. B	6. C	9. D	12. A

1. $y = x^2 - 2x - 3$

$x = 0 \Rightarrow y = 0^2 - 2 \cdot 0 - 3 = -3$

$y = 0 \Rightarrow x^2 - 2x - 3 = 0$

$\downarrow \qquad \downarrow$

$x \qquad -3$

$x \qquad +1$

$(x - 3)(x + 1) = 0$

$x - 3 = 0 \qquad x + 1 = 0$

$x = 3 \qquad x = -1$

Yanıt / Answer A

2. $y = 4x^2 - 12x + 2m + 1, \quad T(r, k) = T(x_1, 0)$

$$x_1 = \frac{-(-12)}{2 \cdot 4} = \frac{3}{2}$$

$$0 = 4 \cdot \left(\frac{3}{2}\right)^2 - 12 \cdot \frac{3}{2} + 2m + 1$$

$2m = 8 \Rightarrow m = 4$

Yanıt / Answer C

3. $y = x^2 + (m - 3)x + m, \qquad T(1,0)$

$$1 = \frac{-(m-3)}{2}$$

$2 = 3 - m \Rightarrow m = 1$

Yanıt / Answer B

4. $y = 3x^2 - 12x + 7$

$$r = \frac{-b}{2a} = \frac{-(-12)}{2 \cdot 3} = 2$$

$\min(f(x)) = 3 \cdot 2^2 - 12 \cdot 2 + 7 = -5$

Yanıt / Answer A

5. $x^2 + 3x + 2m - 1 = -x + 3$

$x^2 + 4x + 2m - 4 = 0$

$\Delta = 0$

$b^2 - 4ac = 0$

$4^2 - 4 \cdot 1(2m - 4) = 0$

$16 = 4(2m - 4)$

$4 = 2m - 4$

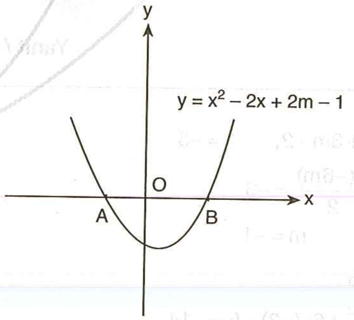
$m = 4$

$y = x^2 + 3x + 7$

$x = 0 \Rightarrow y = 7$

Yanıt / Answer D

6.



$|OA| = k \Rightarrow |OB| = 3k$

$x_1 = -k, \; x_2 = 3k$

$$x_1 + x_2 = -k + 3k = 2k = \frac{-(-2)}{1} \Rightarrow k = 1$$

$$x_1 = -1, \; x_2 = 3 \Rightarrow x_1 \cdot x_2 = \frac{2m-1}{1} = -3 = 2m - 1$$

$m = -1$

Yanıt / Answer C

7. $y = f(x) = x^2 - 2x + m,\ A(3, -1)$

$-1 = 3^2 - 2\cdot 3 + m$

$-1 = 3 + m \Rightarrow m = -4$

Yanıt / Answer C

---

8. $y = a\cdot(x - x_1)\cdot(x - x_2)$

$y = a\cdot(x + 1)\cdot(x - 3)$

$(0, -3) \in y \Rightarrow -3 = a\cdot 1\cdot(-3) \Rightarrow a = 1$

$y = (x + 1)\cdot(x - 3)$

$y = x^2 - 2x - 3 \Rightarrow a + b + c = 1 - 2 - 3 = -4$

Yanıt / Answer B

---

9. $y = x^2 - 6mx + 3m - 2, \qquad r = -3$

$r = \frac{-b}{2a} \Rightarrow \frac{-(-6m)}{2} = -3$

$m = -1$

$y = x^2 + 6x - 5$

$\min(y) = (-3)^2 + 6\cdot(-3) - 5 = -14$

Yanıt / Answer D

---

10. $y = a(x - x_1)(x - x_2)$

$y = a(x + 1)(x - 3)$

$(0, 6) \in y \Rightarrow 6 = a\cdot 1\cdot(-3)$

$a = -2$

$y = (-2)(x + 1)(x - 3)$

$y = -2x^2 + 4x + 6$

$\Rightarrow a - b + c = -2 - 4 + 6 = 0$

Yanıt / Answer A

---

11. $T(r,k) = T(r,0)$

$\frac{4ac - b^2}{4a} = 0$

$\frac{4(m^2 - 21) - 4(m - 3)^2}{4} = 0$

$(m^2 - 21) - (m - 3)^2 = 0$

$m^2 - 21 = m^2 - 6m + 9$

$m = 5$

$a = m^2 - 21 = 5^2 - 21 = 4$

Yanıt / Answer C

---

12. $y = f(x) = a(x - r)^2 + k \qquad T(r,k) = T(2,1)$

$y = a(x - 2)^2 + 1$

$(0,3) \in y \Rightarrow 3 = 4a + 1$

$a = \frac{1}{2}$

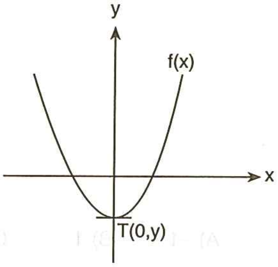
$f(x) = \frac{1}{2}\cdot(x - 2)^2 + 1$

$f(4) = \frac{1}{2}\cdot(4 - 2)^2 + 1 = 3$

Yanıt / Answer A

1. $f(x) = x^2 - (m + 3)x - 4$

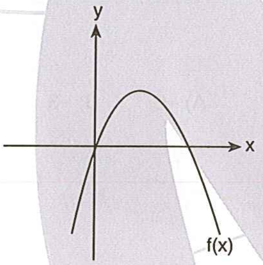
$\Rightarrow$ **m = ?**



A) –3 B) –2 C) 0 D) 2 E) 3

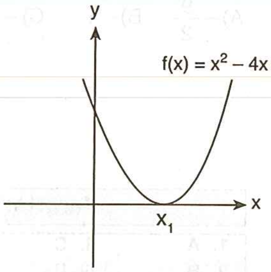
2. $f(x) = (m-1)x^2 + 4x - m^2+1$

$\Rightarrow$ **m = ?**



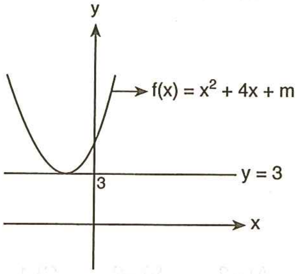
A) –2 B) –1 C) 0 D) 1 E) 2

3. **$x_1 + n = ?$**


y
f(x) = x² – 4x + n
x
x₁

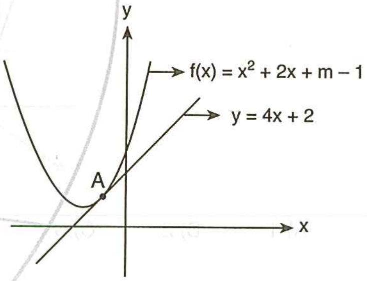
A) –4 B) –2 C) 2 D) 4 E) 6

4. **m = ?**


y
f(x) = x² + 4x + m
y = 3
3
x

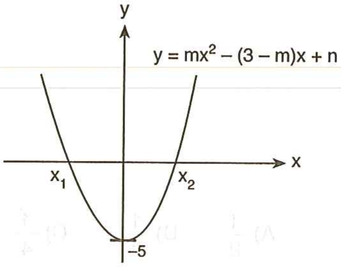
A) 5 B) 6 C) 7 D) 8 E) 9

5. **m = ?**


y
f(x) = x² + 2x + m – 1
y = 4x + 2
A
x

A) –2 B) –1 C) 1 D) 2 E) 4

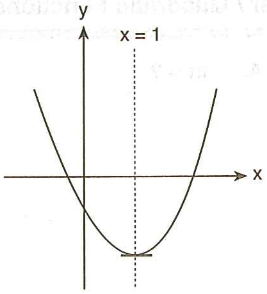
6. **m + n = ?**


y
y = mx² – (3 – m)x + n
x
x₁
x₂
–5

A) –8 B) –5 C) –2 D) 2 E) 5

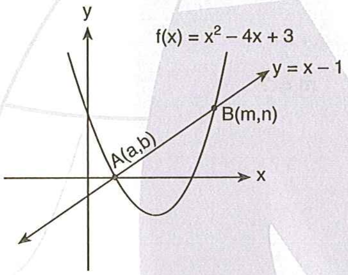
7. $f(x) = (m-2)x^2 + (1-m)x + 1-3m$

$\Rightarrow$ **m = ?**



A) –3 B) –2 C) 1 D) 3 E) 4

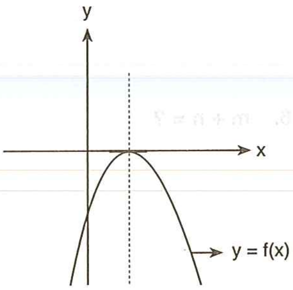
8. **b + n = ?**


y
f(x) = x² – 4x + 3
y = x – 1
B(m,n)
A(a,b)
x

A) 1 B) 2 C) 3 D) 4 E) 5

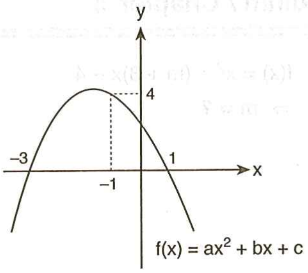
9. $f(x) = (m-1)x^2 - (2m+1)x + m+1$

T(r, k) $\Rightarrow$ **r = ?**



A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{1}{4}$ D) $\frac{1}{5}$ E) $\frac{1}{6}$

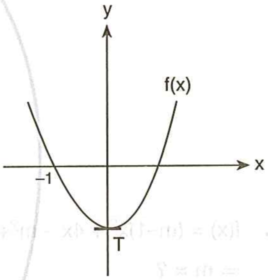
10. **2a – b + c = ?**


y
4
–3
1
x
–1
f(x) = ax² + bx + c

A) –1 B) 1 C) 2 D) 3 E) 4

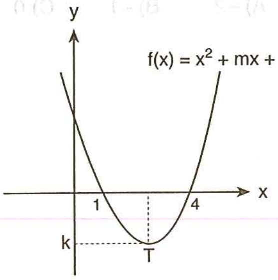
11. T(0, –3)

$\Rightarrow$ **a + b – c = ?**



A) –6 B) –3 C) 0 D) 3 E) 6

12. **k = ?**


y
f(x) = x² + mx + n
x
1
4
k
T

A) $-\frac{9}{2}$ B) -4 C) $-\frac{5}{2}$ D) $-\frac{9}{4}$ E) $-\frac{7}{4}$

Yanıtlar / Answers

1. A	4. C	7. D	10. D
2. B	5. E	8. C	11. E
3. E	6. C	9. B	12. D

1. $f(x)=x^2-(m+3)x-4$

$T(0,y) \Rightarrow \dfrac{-b}{2a}=0$

$\dfrac{m+3}{2}=0$

$m+3=0 \Rightarrow m=-3$

Yanıt / Answer A

---

2. $f(x)=(m-1)x^2+4x-m^2+1$

$(0,0)\in f(x) \Rightarrow 0=-m^2+1$

$m^2=1$

$\Rightarrow m_1=+1 \quad m_2=-1$

$m-1\neq 0 \Rightarrow m\neq 1$

$\Rightarrow m=-1$

Yanıt / Answer B

---

3. $T(r,k)=T(x_1,0)$

$x_1=\dfrac{-b}{2a}=\dfrac{4}{2}=2$

$(2,0)\in f(x) \Rightarrow 0=2^2-4\cdot 2+n$

$n=4$

$\Rightarrow x_1+n=2+4=6$

Yanıt / Answer E

---

4. $y=x^2+4x+m, \qquad y=3$

$x^2+4x+m=3$

$x^2+4x+m-3=0$

$\Delta=b^2-4ac=0$

$4^2-4\cdot 1\cdot(m-3)=0$

$16=4(m-3)$

$m=7$

Yanıt / Answer C

---

5. $y=x^2+2x+m-1, \qquad y=4x+2$

$x^2+2x+m-1=4x+2$

$x^2-2x+m-3=0$

$\Delta=0$

$(-2)^2-4\cdot 1\cdot(m-3)=0$

$4=4(m-3)$

$m=4$

Yanıt / Answer E

---

6. $y=mx^2-(3-m)x+n \qquad T(0,-5)$

$(0,-5)\in y \Rightarrow -5=m\cdot 0-(3-m)\cdot 0+n$

$n=-5$

$y=mx^2-(3-m)x-5$

$r=0=\dfrac{-(3-m)}{2m}$

$m-3=0 \Rightarrow m=3$

$\Rightarrow m+n=3-5=-2$

Yanıt / Answer C

7. $y=(m-2)x^2+(1-m)x+1-3m \qquad T(r,k)=T(1,k)$

$$r=\frac{-b}{2a} \Rightarrow 1=\frac{-(1-m)}{2(m-2)}$$

$$2m-4=m-1$$

$$m=3$$

Yanıt / Answer D

---

8. $f(x)=x^2-4x+3, \quad y=x-1$

$(f(x)\cap y)=\{A,B\} \Rightarrow x^2-4x+3=x-1$

$x^2-5x+4=0$

$(x-4)(x-1)=0$

$x=4,\ x=1$

$x=4 \Rightarrow y=x-1$

$y=3 \qquad B(m,n)=B(4,3)$

$x=1 \Rightarrow y=x-1 \qquad A(a,b)=A(1,0)$

$y=0$

$b+n=0+3=3$

Yanıt / Answer C

---

9. $f(x)=(m-1)x^2-(2m+1)x+m+1$

$T(r,k)=T(r,0)$

$$0=\frac{4(m-1)(m+1)-[-(2m+1)]^2}{4(m-1)}$$

$$-4m-5=0 \Rightarrow m=-\frac{5}{4}$$

$$f(x)=-\frac{9}{4}x^2+\frac{3}{2}x-\frac{1}{4}$$

$$r=\frac{-b}{2a}$$

$$r=\frac{-\frac{3}{2}}{-\frac{9}{4}\cdot 2}=\frac{1}{3}$$

Yanıt / Answer B

---

10. $y=a(x-x_1)\cdot(x-x_2)$

$y=a(x+3)(x-1)$

$(-1,4)\in y \Rightarrow 4=a\cdot 2\cdot(-2)$

$a=-1$

$y=-x^2-2x+3$

$\Rightarrow 2a-b+c=2\cdot(-1)-(-2)+3=3$

Yanıt / Answer D

---

11. $y=a(x-r)^2+k \qquad T(0,-3)$

$y=a(x-0)^2-3$

$y=ax^2-3$

$(-1,0)\in y \Rightarrow 0=a(-1)^2-3$

$a=3$

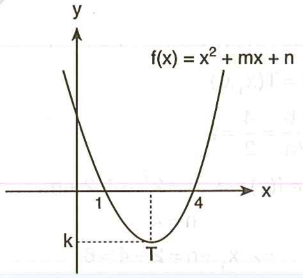
$y=3x^2-3$

$\Rightarrow a+b-c=3+0-(-3)=6$

Yanıt / Answer E

---

12. $T(r,k)=T\left(\frac{5}{2},k\right)$



$y=x^2+mx+n$

$$r=\frac{-b}{2a}$$

$$\frac{5}{2}=\frac{-m}{2}$$

$m=-5$

$y=x^2-5x+n$

$(1,0)\in y \Rightarrow 0=1-5+n$

$n=4$

$y=x^2-5x+4$

$$k=\frac{4ac-b^2}{4a}=\frac{4\cdot 4-(-5)^2}{4}=-\frac{9}{4}$$

Yanıt / Answer D

L

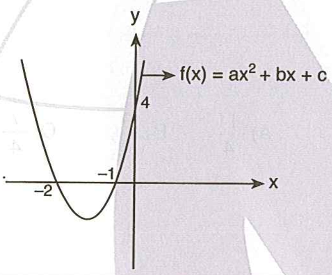
1. $f(x) = (m-1)x^2 - 2(m-3)x + m - 2$

ÇK(SS) = $\{x_1, x_2\}$, $x_1 + x_2 = 4$

$\Rightarrow$ **max [f(x)] = ?**

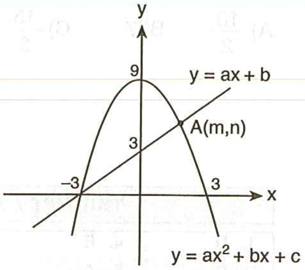
A) 2 B) 3 C) 4 D) 5 E) 6

2. **f(3) = ?**


y
f(x) = ax² + bx + c
4
–1
–2
x

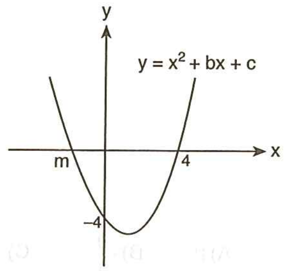
A) 28 B) 32 C) 36 D) 40 E) 44

3. **m + n = ?**


y
9
y = ax + b
A(m,n)
3
–3
3
x
y = ax² + bx + c

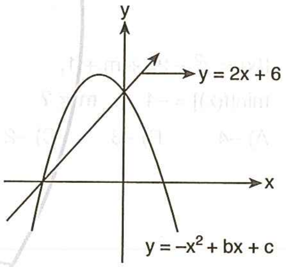
A) 6 B) 7 C) 8 D) 9 E) 10

4. **m = ?**


y
y = x² + bx + c
x
m
4
–4

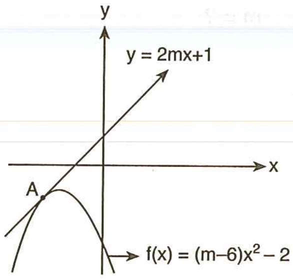
A) –5 B) –4 C) –3 D) –2 E) –1

5. **c – b = ?**


y
y = 2x + 6
x
y = –x² + bx + c

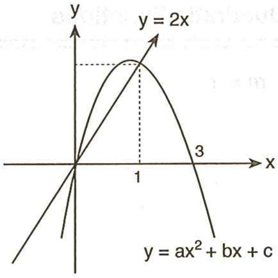
A) 7 B) 8 C) 9 D) 10 E) 11

6. **m = ?**


y
y = 2mx+1
x
A
f(x) = (m–6)x² – 2

A) 1 B) 2 C) 3 D) 4 E) 5

7. **max [f(x)] = ?**



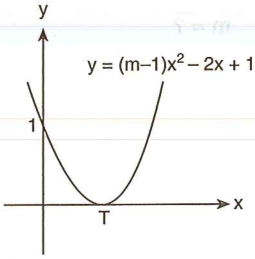
y
y = 2x
3
x
1
y = ax² + bx + c

A) 2 B) $\frac{9}{4}$ C) $\frac{5}{4}$ D) $\frac{9}{2}$ E) $\frac{5}{2}$

8. $f(x) = x^2 - 2x + m + 1$,
$\min[f(x)] = -4 \Rightarrow$ **m = ?**

A) –4 B) –3 C) –2 D) –1 E) 0

9. **m = ?**



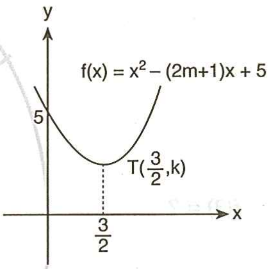
y
y = (m–1)x² – 2x + 1
1
x
T

A) –2 B) –1 C) 0 D) 1 E) 2

10. $f(x) = -3x^2 + 12x - 7 \Rightarrow$ **max [f(x)] = ?**

A) 2 B) 3 C) 4 D) 5 E) 6

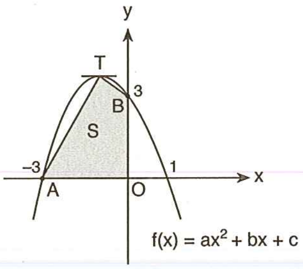
11. $f\left(\frac{3}{2}\right) = ?$



y
f(x) = x² – (2m+1)x + 5
5
T(3/2,k)
x
3/2

A) $\frac{11}{4}$ B) $\frac{9}{4}$ C) $\frac{7}{4}$ D) $\frac{9}{2}$ E) $\frac{7}{2}$

12. **S = ? br² (u²)**



y
T
3
B
S
–3
1
x
A
O
f(x) = ax² + bx + c

A) $\frac{13}{2}$ B) 7 C) $\frac{15}{2}$ D) 8 E) $\frac{17}{2}$

Yanıtlar / Answers

1. D	**4. E**	**7. B**	**10. D**
2. D	**5. A**	**8. A**	**11. A**
3. B	**6. C**	**9. E**	**12. C**

1. $f(x)=(m-1)x^2-2(m-3)x+m-2$

$x_1+x_2=-\dfrac{b}{a}$

$\dfrac{2(m-3)}{m-1}=4$

$2m-6=4m-4 \Rightarrow m=-1$

$f(x)=-2x^2+8x-3$

$\max[f(x)]=f(r)$

$r=\dfrac{-b}{2a}=\dfrac{-8}{-4}=2$

$f(r)=-2\cdot2^2+8\cdot2-3=5$

Yanıt / Answer D

2. $y=a(x-x_1)(x-x_2)$

$y=a(x+2)(x+1)$

$(0,4)\in y \Rightarrow 4=a\cdot2\cdot1 \Rightarrow a=2$

$y=2(x+2)(x+1)$

$y=2x^2+6x+4$

$f(3)=2\cdot3^2+6\cdot3+4=40$

Yanıt / Answer D

3. $\dfrac{x}{a}+\dfrac{y}{b}=1 \Rightarrow \dfrac{x}{-3}+\dfrac{y}{3}=1 \Rightarrow y=x+3 \quad \ldots\textbf{(1)}$

$y=a(x-x_1)(x-x_2)$

$y=a(x+3)(x-3)$

$(0,9)\in y \Rightarrow 9=a\cdot3\cdot(-3) \Rightarrow a=-1$

$y=(-1)(x+3)(x-3)$

$y=9-x^2 \quad \ldots\textbf{(2)}$

$x+3=9-x^2$

$x^2+x-6=0$

$(x+3)(x-2)=0$

$x=-3, \quad x=2$

$y=x+3 \Rightarrow x=2 \Rightarrow y=3+2=5$

$A(m,n)=A(2,5) \Rightarrow m+n=7$

Yanıt / Answer B

4. $x_1=m,\ x_2=4,\ c=-4$

$x_1\cdot x_2=-\dfrac{4}{1}$

$4m=-4$

$m=-1$

Yanıt / Answer E

5. $x=0 \Rightarrow y=2x+6 \Rightarrow y=6$

$y=0 \Rightarrow y=2x+6 \Rightarrow x=-3$

$(0,6)\in y=-x^2+bx+c \Rightarrow 6=0+b\cdot0+c$

$c=6$

$y=-x^2+bx+6$

$(-3,0)\in y=-x^2+bx+6 \Rightarrow 0=-(-3)^2+b(-3)+6$

$b=-1$

$\Rightarrow c-b=6-(-1)=7$

Yanıt / Answer A

6. $2mx+1=(m-6)x^2-2$

$(m-6)x^2-2mx-3=0 \qquad \Delta=b^2-4ac=0$

$\Delta=(-2m)^2-4\cdot(m-6)(-3)=0$

$4m^2=4(m-6)\cdot(-3)$

$m^2+3m-18=0$

$m \qquad +6$

$m \qquad -3$

$(m+6)(m-3)=0$

$m=3$

Yanıt / Answer C

7. $y = a(x - x_1)(x - x_2)$

$y = a(x - 0)(x - 3)$

$y = a \cdot x(x - 3)$

$(1,2) \in y = ax^2 + bx + c \;\Rightarrow\; 2 = a \cdot (-2) \;\Rightarrow\; a = -1$

$y = (-1)x(x - 3)$

$y = 3x - x^2$

$r = \dfrac{-b}{2a} = \dfrac{3}{2}$

$\max(y) = 3 \cdot \dfrac{3}{2} - \left(\dfrac{3}{2}\right)^2 = \dfrac{9}{4}$

Yanıt / Answer B

8. $y = x^2 - 2x + m + 1$ $\qquad T(r,k)$

$\min[f(x)] = -4 \;\Rightarrow\; f(r) = -4$

$r = \dfrac{-b}{2a} = \dfrac{2}{2} = 1$

$f(1) = 1^2 - 2 \cdot 1 + m + 1 = -4 \;\Rightarrow\; m = -4$

Yanıt / Answer A

9. $T(x,0)$

$y = (m-1)x^2 - 2x + 1$

$0 = \dfrac{4ac - b^2}{4a}$

$0 = \dfrac{4(m-1) \cdot 1 - (-2)^2}{4(m-1)}$

$4(m-1) - 4 = 0$

$4(m-1) = 4$

$m - 1 = 1 \;\Rightarrow\; m = 2$

Yanıt / Answer E

10. $f(x) = -3x^2 + 12x - 7,$

$\max[f(x)] = f(r)$

$r = \dfrac{-b}{2a} = \dfrac{-12}{-6} = 2$

$f(r) = f(2)$

$= -3 \cdot 2^2 + 12 \cdot 2 - 7 = 5$

Yanıt / Answer D

11. $f(x) = x^2 - (2m+1)x + 5$

$r = \dfrac{-b}{2a} \;\Rightarrow\; \dfrac{3}{2} = \dfrac{-[-(2m+1)]}{2}$

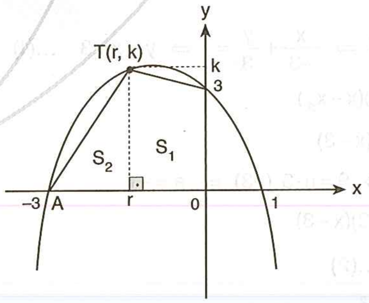
$3 = 2m + 1 \;\Rightarrow\; m = 1$

$f(x) = x^2 - 3x + 5$

$f\left(\dfrac{3}{2}\right) = \left(\dfrac{3}{2}\right)^2 - 3 \cdot \dfrac{3}{2} + 5 = \dfrac{11}{4}$

Yanıt / Answer A

12.



$y = a(x - x_1) \cdot (x - x_2)$

$y = a(x+3)(x-1)$

$(0,3) \in y \;\Rightarrow\; 3 = a \cdot 3(-1) \;\Rightarrow\; a = -1$

$\Rightarrow\; y = -1(x+3)(x-1) = -x^2 - 2x + 3$

$T(r,k) = \left(\dfrac{-b}{2a}, \dfrac{4ac - b^2}{4a}\right) = (-1,4)$

$S_1 + S_2 = \dfrac{(3+4) \cdot 1}{2} + \dfrac{2 \cdot 4}{2} \;\Rightarrow\; S = \dfrac{15}{2}\ br^2 (u^2)$

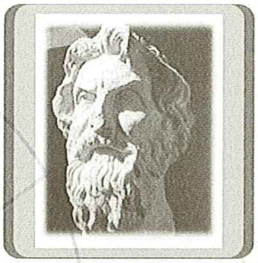
Yanıt / Answer C

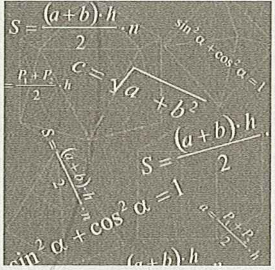
ÜNİTE 7
UNIT

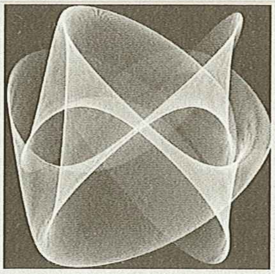
Aristarchus of Samos [about 270 BC]

Yunan gökbilimci. Dünya'nın Güneş etrafındaki dönüşünü açıklayan ilk astronomlardan biridir. Güneş ve Ay'ın Dünya'ya olan uzaklıklarını bulmak için geometrik yöntemleri kullanmıştır.

Greek astronomer, noted for being the first to affirm that the Earth rotates and travels around the Sun. He treated astronomy mathematically and used geometrical methods to calculate the relative sizes of the Sun and Moon and their relative distances from the Earth.

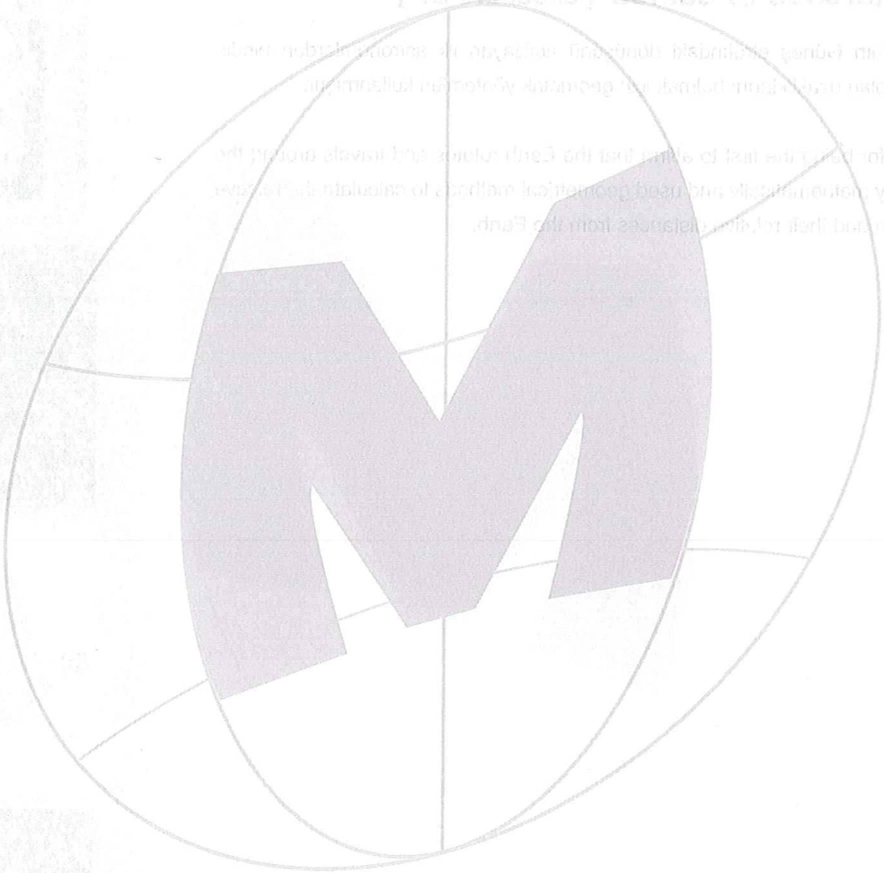



$S=\frac{(a+b)\cdot h}{2}\cdot n$
$\sin^2\alpha+\cos^2\alpha=1$
$\frac{P_1+P_2}{2}\cdot h$
$c=\sqrt{a^2+b^2}$
$S=\frac{(a+b)\cdot h}{2}$
$\sin^2\alpha+\cos^2\alpha=1$



✓ **TRİGONOMETRİ 1** .... **259 – 278**
✓ **TRİGONOMETRİ 2** .... **279 – 298**
✓ **KARMAŞIK SAYILAR** .... **299 – 310**
✓ **LOGARİTMA** .... **311 – 330**

✓ TRIGONOMETRY 1 .... 259 – 278
✓ TRIGONOMETRY 2 .... 279 – 298
✓ COMPLEX NUMBERS .... 299 – 310
✓ LOGARITHM .... 311 – 330



TRİGONOMETRİ
TRIGONOMETRY 1

BÖLÜM
CHAPTER
1

Trigonometri / Trigonometry 1

Test 1

1. $120° = x \cdot \pi \Rightarrow$ **$x = ?$**

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{2}{3}$ D) $\frac{1}{4}$ E) $\frac{3}{4}$

2. $\alpha = \frac{5\pi}{3}$, $\alpha = x° \Rightarrow$ **$x = ?$**

A) 180 B) 210 C) 270 D) 280 E) 300

3. $1955° = \alpha + k \cdot 360° \Rightarrow$ **$\alpha = ?$**

A) 155° B) 165° C) 185° D) 215° E) 225°

4. $-1938° = \alpha + k \cdot 360° \Rightarrow$ **$\alpha = ?$**

A) 138° B) 158° C) 212° D) 222° E) 232°

5. $\frac{45\pi}{4} = \alpha + k \cdot 2\pi \Rightarrow$ **$\alpha = ?$**

A) $\frac{\pi}{4}$ B) $\frac{\pi}{2}$ C) $\frac{3\pi}{4}$ D) π E) $\frac{5\pi}{4}$

6. $-\frac{134\pi}{3} = \alpha + k2\pi \Rightarrow$ **$\alpha = ?$**

A) $\frac{\pi}{3}$ B) $\frac{2\pi}{3}$ C) π D) $\frac{4\pi}{3}$ E) $\frac{5\pi}{3}$

7. $\frac{1+\tan x}{1+\cot x} = A \Rightarrow$ **$A = ?$**

A) sinx B) cosx C) tanx
D) cotx E) 1

8. $\frac{1}{\sin^2 x} - \frac{1}{\tan^2 x} = A \Rightarrow$ **$A = ?$**

A) –1 B) 1 C) sinx D) tanx E) cosx

9. $A=\dfrac{\sin x}{\sec x}-\dfrac{\cos x}{\operatorname{cosec} x} \Rightarrow$ **A = ?**

A) –1 B) 0 C) 1 D) sinx E) cosx

10. $\cos^3x+\sin^2x\cdot\cos x=A \Rightarrow$ **A = ?**

A) cosx B) sinx C) $\cos^2x$

D) $\sin^2x$ E) 1

11. $\dfrac{\cos^2x-1}{\sin^2x}=A \Rightarrow$ **A = ?**

A) –1 B) 0 C) 1 D) sinx E) cosx

12. $A=\tan^2x\cdot\cos^2x+\cot^2x\cdot\sin^2x \Rightarrow$ **A = ?**

A) –1 B) 1 C) tanx D) cotx E) 1+sinx

13. $A=\sin^2x\cdot\sec^2x-\sec^2x \Rightarrow$ **A = ?**

A) –1 B) sinx C) 1 D) cosx E) tanx

14. $\dfrac{2\sin x+\cos x}{2\sin x+6\cos x}=\dfrac{1}{3} \Rightarrow$ **cotx = ?**

A) $\dfrac{5}{2}$ B) $\dfrac{7}{2}$ C) $\dfrac{7}{24}$ D) $\dfrac{3}{4}$ E) $\dfrac{4}{3}$

15. $\dfrac{\mathbf{1+\sin Q}}{\mathbf{1+\cos Q}}\cdot\dfrac{\mathbf{1+\sec Q}}{\mathbf{1+\operatorname{cosec} Q}}=\mathbf{?}$

A) cotQ B) tanQ C) sin2Q

D) secQ E) cosecQ

16. $\tan x+\cot x=\dfrac{4}{\sqrt{3}} \Rightarrow$ $\mathbf{\tan^2x+\cot^2x=?}$

A) $\dfrac{4}{3}$ B) $\dfrac{10}{3}$ C) $\dfrac{25}{4}$

D) $\dfrac{4}{9}$ E) 1

[MARMARA ÜNV. YÖS 2013]

Yanıtlar / Answers

1. C	**4. D**	**7. C**	**10. A**	**13. A**	**16. B**
2. E	**5. E**	**8. B**	**11. A**	**14. E**	
3. A	**6. D**	**9. B**	**12. B**	**15. B**	

1.
$$\frac{D}{180°}=\frac{R}{\pi}$$

$$\frac{120°}{180°}=\frac{x\pi}{\pi} \Rightarrow 120\pi=180x\pi$$

$$x=\frac{120°}{180°}=\frac{2}{3}$$

Yanıt / Answer C

2.
$$\frac{R}{\pi}=\frac{D}{180°} \Rightarrow \frac{\frac{5\pi}{3}}{\pi}=\frac{D}{180°} \Rightarrow \frac{5}{3}=\frac{D}{180°}$$

$$D=\frac{180°\cdot 5}{3}$$

$$=60°\cdot 5$$

$$=300°$$

Yanıt / Answer E

---

3. $1955° = \alpha + k\cdot 360°$

$$\begin{array}{r|l} 1955° & 360° \\ \underline{-1800°} & 5 \\ 155° = \alpha & \end{array}$$

$$\Rightarrow \alpha = 155°$$

Yanıt / Answer A

4.
$$\begin{array}{r|l} 1938° & 360° \\ \underline{-1800°} & 5 \\ 138° & \end{array}$$

$$\alpha = 360° - 138° = 222°$$

Yanıt / Answer D

5.
$$\begin{array}{r|l} 45 & 8 \\ \underline{-40} & 5 \\ 5 & \end{array}$$

$$5\pi = 4\alpha$$

$$\alpha = \frac{5\pi}{4}$$

Yanıt / Answer E

6.
$$\begin{array}{r|l} 134° & 6 \\ \underline{-132°} & 22 \\ 2 & \end{array}$$

$$\alpha = \frac{-2\pi}{3}+2\pi=\frac{4\pi}{3}$$

Yanıt / Answer D

7.
$$A=\frac{1+\tan x}{1+\cot x}$$

$$=\frac{1+\frac{\sin x}{\cos x}}{1+\frac{\cos x}{\sin x}}=\frac{\frac{\cos x+\sin x}{\cos x}}{\frac{\sin x+\cos x}{\sin x}}$$

$$=\frac{\cos x+\sin x}{\cos x}\cdot\frac{\sin x}{\sin x+\cos x}$$

$$=\frac{\sin x}{\cos x}=\tan x$$

Yanıt / Answer C

8.
$$A=\frac{1}{\sin^2 x}-\frac{1}{\left(\frac{\sin x}{\cos x}\right)^2}$$

$$=\frac{1}{\sin^2 x}-\frac{\cos^2 x}{\sin^2 x}$$

$$=\frac{1-\cos^2 x}{\sin^2 x} \quad , \quad (\cos^2 x+\sin^2 x=1)$$

$$=\frac{\sin^2 x}{\sin^2 x}=1$$

Yanıt / Answer B

9. $A=\dfrac{\sin x}{\sec x}-\dfrac{\cos x}{\operatorname{cosec} x}\quad\left[\sec x=\dfrac{1}{\cos x},\ \operatorname{cosec} x=\dfrac{1}{\sin x}\right]$

$$=\frac{\sin x}{\frac{1}{\cos x}}-\frac{\cos x}{\frac{1}{\sin x}}$$

$$=\sin x\cdot\cos x-\cos x\cdot\sin x=0$$

Yanıt / Answer B

10. $A=\cos^3 x+\sin^2 x\cdot\cos x$

$$=\cos x(\underbrace{\cos^2 x+\sin^2 x}_{1})$$

$$=\cos x$$

Yanıt / Answer A

11. $A=\dfrac{\cos^2 x-1}{\sin^2 x}\quad[\cos^2 x+\sin^2 x=1\ \Rightarrow\ \cos^2 x=1-\sin^2 x]$

$$=\frac{1-\sin^2 x-1}{\sin^2 x}$$

$$=\frac{-\sin^2 x}{\sin^2 x}$$

$$=-1$$

Yanıt / Answer A

12. $A=\tan^2 x\cdot\cos^2 x+\cot^2 x\sin^2 x$

$$=\frac{\sin^2 x}{\cos^2 x}\cdot\cos^2 x+\frac{\cos^2 x}{\sin^2 x}\cdot\sin^2 x$$

$$=\ \sin^2 x+\cos^2 x$$

$$=1$$

Yanıt / Answer B

13. $A=\sin^2 x\cdot\sec^2 x-\sec^2 x$

$$=\sec^2 x\ \cdot\ (\sin^2 x-1)$$

$$=-\sec^2 x\cdot\cos^2 x$$

$$=-\frac{1}{\cos^2 x}\cdot\cos^2 x$$

$$=-1$$

Yanıt / Answer A

14. $\dfrac{2\sin x+\cos x}{2\sin x+6\cos x}=\dfrac{1}{3}$

$$2\sin x+6\cos x=3(2\sin x+\cos x)$$

$$2\sin x+6\cos x=6\sin x+3\cos x$$

$$3\cos x=4\sin x$$

$$\frac{3\cos x}{3\sin x}=\frac{4\sin x}{3\sin x}$$

$$=\cot x=\frac{4}{3}$$

Yanıt / Answer E

15. $\dfrac{1+\sin Q}{1+\cos Q}\cdot\dfrac{1+\sec Q}{1+\operatorname{cosec} Q}$

$$=\frac{1+\sin Q}{1+\cos Q}\cdot\frac{1+\frac{1}{\cos Q}}{1+\frac{1}{\sin Q}}$$

$$=\frac{1+\sin Q}{1+\cos Q}\cdot\frac{\frac{1+\cos Q}{\cos Q}}{\frac{\sin Q+1}{\sin Q}}$$

$$=\frac{1+\sin Q}{1+\cos Q}\cdot\frac{1+\cos Q}{\cos Q}\cdot\frac{\sin Q}{1+\sin Q}=\frac{\sin Q}{\cos Q}=\tan Q$$

Yanıt / Answer B

16. $\tan x+\cot x=\dfrac{4}{\sqrt{3}}$

$$(\tan x+\cot x)^2=\left(\frac{4}{\sqrt{3}}\right)^2$$

$$\tan^2 x+2\cdot\tan x\cdot\cot x+\cot^2 x=\frac{16}{3}$$

$$\tan^2 x+2+\cot^2 x=\frac{16}{3}$$

$$\tan^2 x+\cot^2 x=\frac{16}{3}-2$$

$$\tan^2 x+\cot^2 x=\frac{16-6}{3}=\frac{10}{3}$$

Yanıt / Answer B

1. $(\tan x+\sec x)^2 \cdot \dfrac{1-\sin x}{1+\sin x} = ?$

A) 1 B) 1 + sinx C) 0 D) $\sec^2 x$ E) cosx

2. tanx + cotx = 3

$\Rightarrow \tan^2 x + \cot^2 x = ?$

A) 6 B) 7 C) 8 D) 9 E) 10

3. $\dfrac{\sin x+\sec x}{\cos x+\operatorname{cosec} x} = 2 \quad \Rightarrow \quad \cot x = ?$

A) 1 B) $\dfrac{1}{2}$ C) 2 D) $\dfrac{2}{3}$ E) $\dfrac{3}{4}$

4. $\dfrac{\tan\theta+1}{\cot\theta+1} = ?$

A) cotθ B) −cotθ C) −tanθ D) tanθ E) sinθ

5. $\dfrac{1-\sec^2 x}{1-\operatorname{cosec}^2 x} = ?$

A) $\sec^2 x$ B) $\cot^4 x$ C) $\tan^4 x$ D) $\operatorname{cosec}^2 x$ E) $\tan^2 x \cdot \cot x$

6. $\dfrac{1+\tan\theta}{\sec\theta} - \sin\theta = ?$

A) sinθ B) tanθ C) cotθ D) secθ E) cosθ

7. $0 < x < \frac{\pi}{2}$, $\cos x = \frac{5}{13}$ $\Rightarrow$ $\sin x = ?$

A) $\frac{1}{13}$ B) $\frac{4}{13}$ C) $\frac{8}{13}$ D) $\frac{10}{13}$ E) $\frac{12}{13}$

8. $0 < x < \frac{\pi}{2}$, $3\sin x - 4\cos x = 0$ $\Rightarrow$ $\sin x + \cos x = ?$

A) $\frac{3}{5}$ B) $\frac{4}{5}$ C) 1 D) $\frac{6}{5}$ E) $\frac{7}{5}$

9. $\frac{\pi}{2} < x < \pi$, $\tan x = -3$

$\Rightarrow$ $(\sin x + \cos x)^2 : \cot x = ?$

A) $-\frac{5}{6}$ B) $-\frac{6}{5}$ C) $\frac{5}{6}$ D) $\frac{6}{5}$ E) $-\frac{24}{5}$

10. $\pi < x < \frac{3\pi}{2}$, $\cos x = -\frac{1}{3}$

$\Rightarrow$ $\sin x \cdot \cot x - \tan^2 x = ?$

A) $-\frac{25}{3}$ B) $-\frac{23}{3}$ C) $-\frac{17}{3}$ D) $\frac{23}{3}$ E) $\frac{25}{3}$

11. $\frac{3\pi}{2} < x < 2\pi$, $\cos x = \frac{2}{3}$

$\Rightarrow$ $\cot^2 x - \sin x \cdot \tan x = ?$

A) $-\frac{1}{30}$ B) $\frac{1}{30}$ C) $\frac{3}{10}$ D) $\frac{7}{10}$ E) $\frac{49}{30}$

12. $$\frac{\sin\frac{5\pi}{6} + \cos\frac{3\pi}{4}}{\sin\frac{11\pi}{6}} = ?$$

A) $\sqrt{2}$ B) $\frac{\sqrt{3}}{2}$ C) $\sqrt{2} - 1$

D) -1 E) $\frac{\sqrt{2}}{2} + 1$

[KTÜ. YÖS 2013]

Yanıtlar / Answers

1. A	4. D	7. E	10. A
2. B	5. C	8. E	11. A
3. B	6. E	9. B	12. C

1.

$$(\tan x+\sec x)^2\cdot\frac{1-\sin x}{1+\sin x}$$

$$=\left(\frac{\sin x}{\cos x}+\frac{1}{\cos x}\right)^2\cdot\frac{1-\sin x}{1+\sin x}$$

$$=\frac{(\sin x+1)^2}{\cos^2 x}\cdot\frac{1-\sin x}{1+\sin x}$$

$$=\frac{\sin x+1}{\cos^2 x}\cdot(1-\sin x)$$

$$=\frac{1-\sin^2 x}{\cos^2 x}=\frac{\cos^2 x}{\cos^2 x}=1$$

Yanıt / Answer A

2.

$$\tan x+\cot x=3$$

$$(\tan x+\cot x)^2=9$$

$$\tan^2 x+\cot^2 x+2\underbrace{\tan x\cdot\cot x}_{1}=9$$

$$\tan^2 x+\cot^2 x+2=9$$

$$\tan^2 x+\cot^2 x=7$$

Yanıt / Answer B

3.

$$\frac{\sin x+\sec x}{\cos x+\operatorname{cosec} x}=2$$

$$\frac{\sin x+\dfrac{1}{\cos x}}{\cos x+\dfrac{1}{\sin x}}=2$$

$$\frac{\sin x\cdot\cos x+1}{\cos x}\cdot\frac{\sin x}{\cos x\cdot\sin x+1}=2$$

$$\frac{\sin x}{\cos x}=2\Rightarrow\tan x=2\Rightarrow\cot x=\frac{1}{2}$$

Yanıt / Answer B

4.

$$\frac{\tan\theta+1}{\cot\theta+1}=\frac{\dfrac{\sin\theta}{\cos\theta}+1}{\dfrac{\cos\theta}{\sin\theta}+1}$$

$$=\frac{\dfrac{\sin\theta+\cos\theta}{\cos\theta}}{\dfrac{\cos\theta+\sin\theta}{\sin\theta}}$$

$$=\frac{\sin\theta+\cos\theta}{\cos\theta}\cdot\frac{\sin\theta}{\cos\theta+\sin\theta}=\frac{\sin\theta}{\cos\theta}=\tan\theta$$

Yanıt / Answer D

5.

$$\frac{1-\sec^2 x}{1-\operatorname{cosec}^2 x}=\frac{1-\dfrac{1}{\cos^2 x}}{1-\dfrac{1}{\sin^2 x}}$$

$$=\frac{\dfrac{\cos^2 x-1}{\cos^2 x}}{\dfrac{\sin^2 x-1}{\sin^2 x}}$$

$$=\frac{\cos^2 x-1}{\cos^2 x}\cdot\frac{\sin^2 x}{\sin^2 x-1}$$

$$=\frac{-\sin^2 x}{\cos^2 x}\cdot\frac{\sin^2 x}{-\cos^2 x}$$

$$=\frac{\sin^4 x}{\cos^4 x}=\tan^4 x$$

Yanıt / Answer C

6.

$$\frac{1+\tan\theta}{\sec\theta}-\sin\theta=\frac{1+\dfrac{\sin\theta}{\cos\theta}}{\dfrac{1}{\cos\theta}}-\sin\theta$$

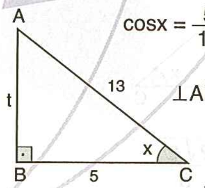
$$=\frac{\cos\theta+\sin\theta}{\cos\theta}\cdot\frac{\cos\theta}{1}-\sin\theta$$

$$=\cos\theta+\sin\theta-\sin\theta$$

$$=\cos\theta$$

Yanıt / Answer E

7.



$$\cos x=\frac{5}{13}=\frac{|BC|}{|AC|}\Rightarrow\begin{cases}|BC|=5\\|AC|=13\end{cases}$$

$$\perp\overset{\Delta}{ABC}\Rightarrow 13^2=5^2+t^2$$

$$\Rightarrow t=12$$

$$\perp\overset{\Delta}{ABC}\Rightarrow\sin x=\frac{|AB|}{|AC|}=\frac{12}{13}$$

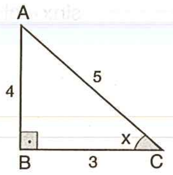
Yanıt / Answer E

8.

$$3\sin x-4\cos x=0$$

$$\frac{3\sin x}{3\cos x}=\frac{4\cos x}{3\cos x}$$

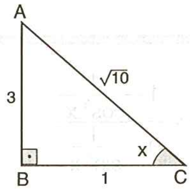
$$\tan x=\frac{4}{3}\Rightarrow$$



$$\sin x+\cos x=\frac{4}{5}+\frac{3}{5}=\frac{7}{5}$$

Yanıt / Answer E

9.



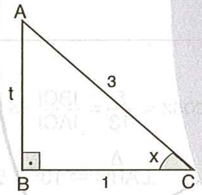
$$\frac{\pi}{2}<x<\pi \Rightarrow \begin{cases} \sin x=+\dfrac{3}{\sqrt{10}} \\ \cos x=-\dfrac{1}{\sqrt{10}} \\ \cot x=-\dfrac{1}{3} \end{cases}$$

$$\frac{(\sin x+\cos x)^2}{\cot x}=\frac{\left(+\dfrac{3}{\sqrt{10}}-\dfrac{1}{\sqrt{10}}\right)^2}{-\dfrac{1}{3}}$$

$$=\frac{\left(\dfrac{2}{\sqrt{10}}\right)^2}{-\dfrac{1}{3}}=-3\cdot\frac{4}{10}=-\frac{6}{5}$$

Yanıt / Answer B

10.



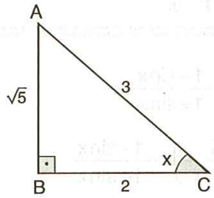
$$\pi<x<\frac{3\pi}{2} \Rightarrow \begin{cases} \sin x=-\dfrac{2\sqrt{2}}{3} \\ \cot x=\dfrac{1}{2\sqrt{2}} \\ \tan x=2\sqrt{2} \end{cases}$$

$$\sin x\cdot\cot x-\tan^2 x=\frac{-2\sqrt{2}}{3}\cdot\frac{1}{2\sqrt{2}}-(2\sqrt{2})^2$$

$$=-\frac{1}{3}-8=\frac{-25}{3}$$

Yanıt / Answer A

11.



$$|AB|^2=3^2-2^2=9-4=5 \Rightarrow |AB|=\sqrt{5}$$

$$\frac{3\pi}{2}<x<2\pi \Rightarrow \begin{cases} \cot x=-\dfrac{2}{\sqrt{5}} \\ \sin x=-\dfrac{\sqrt{5}}{3} \\ \tan x=-\dfrac{\sqrt{5}}{2} \end{cases}$$

$$\cot^2 x-\sin x\cdot\tan x=\left(-\frac{2}{\sqrt{5}}\right)^2-\left(-\frac{\sqrt{5}}{3}\right)\cdot\left(-\frac{\sqrt{5}}{2}\right)$$

$$=\frac{4}{\underset{(6)}{5}}-\frac{5}{\underset{(5)}{6}}=\frac{24-25}{30}=-\frac{1}{30}$$

Yanıt / Answer A

12.

$$\frac{\sin\dfrac{5\pi}{6}+\cos\dfrac{3\pi}{4}}{\sin\dfrac{11\pi}{6}}=\frac{\dfrac{1}{2}-\dfrac{\sqrt{2}}{2}}{-\dfrac{1}{2}}$$

$$=\frac{1-\sqrt{2}}{2}\cdot(-2)$$

$$=\sqrt{2}-1$$

Yanıt / Answer C

1. $\cos\left(\frac{3\pi}{2}+x\right)=?$

A) 2sinx B) –cosx C) cosx

D) –sinx E) sinx

2. $0<x<\frac{\pi}{2} \Rightarrow \sin\left(\frac{3\pi}{2}-x\right)=?$

A) sinx B) –sinx C) cosx

D) –cosx E) 0

3. $A=\sin\left(\frac{3\pi}{2}+x\right)+\cos(2\pi-x)-\tan(\pi-x) \Rightarrow A=?$

A) –sinx

B) –cos2x C) –tanx

D) tanx E) 0

4. $f(x)=\cos\left(\frac{3\pi}{2}-x\right)-\sin(2\pi-x)+\cos(x+\pi)$

$\Rightarrow f\left(\frac{\pi}{2}+x\right)=?$

A) – sinx B) –cosx C) sinx

D) cosx E) 3sinx

5. $\cos(\pi-x)+\sin\left(\frac{3\pi}{2}-x\right)=?$

A) 2cosx B) –2cosx C) 0

D) 2sinx E) –2sinx

6. **Aşağıdakilerden kaç tanesi doğrudur?**

How many are there statements true?

I. $\cot\left(\frac{\pi}{2}+x\right)=\tan x$

II. $\sin\left(x-\frac{3\pi}{2}\right)=\cos x$

III. $\cos(\pi-x)=-\sin x$

IV. $\tan\left(\frac{\pi}{2}+x\right)=-\cot x$

V. $\sin(\pi-x)=\sin x$

A) 1 B) 2 C) 3 D) 4 E) 5

7. $0<x<\frac{\pi}{2}$,

$\tan\left(\frac{\pi}{2}+x\right)-\cot(2\pi-x)=?$

A) –1 B) –2 C) 1 D) 2 E) 0

8. $\frac{\sin 930^\circ+\cos(-1020^\circ)}{\cot 405^\circ}=?$

A) 0 B) $\frac{1}{4}$ C) $\frac{1}{2}$ D) 1 E) $\frac{3}{2}$

9. $\sin\frac{2\pi}{3}=A \Rightarrow$ **A = ?**

A) $-\sin\frac{\pi}{6}$ B) $-\cos\frac{5\pi}{6}$ C) $\cos\frac{5\pi}{6}$

D) $\sin\frac{\pi}{3}$ E) $-\sin\frac{4\pi}{3}$

10. $f(x)=\dfrac{\cos(\pi-x)-\sin(\frac{\pi}{2}+x)}{\tan(\frac{3\pi}{2}+x)} \Rightarrow$ **$f(\pi+x)=?$**

A) –2sinx B) –2cosx C) 2sinx

D) 2cosx E) –sin2x

11. A = cos850° + sin(–660°) + cos770° ⇒ **A = ?**

A) $\frac{\sqrt{3}-1}{2}$ B) $\frac{\sqrt{3}-2}{2}$ C) $\frac{\sqrt{3}+1}{2}$

D) $\frac{\sqrt{3}+2}{2}$ E) $\frac{\sqrt{3}}{2}$

12. **cot 210°·tan 120° – cos 240° = ?**

A) $-\frac{7}{2}$ B) $-\frac{5}{2}$ C) $-\frac{3}{2}$ D) $\frac{3}{2}$ E) $\frac{5}{2}$

13. **tan(–120°) = ?**

A) $-\frac{\sqrt{3}}{3}$ B) $-\sqrt{3}$ C) $\frac{\sqrt{3}}{2}$

D) $\frac{\sqrt{3}}{3}$ E) $\sqrt{3}$

14. **sin91°, cos170°, tan269°, cot358° değerlerinin işaretleri nedir?**

What are the signs of trigonometric values above?

A) +, –, +, – B) +, +, –, – C) –, +, –, +

D) +, –, – ,+ E) +, +, +, –

15. $\left.\begin{aligned} a&=\sin 151^\circ\\ b&=\cos 151^\circ\\ c&=\tan 151^\circ\\ d&=\cot 151^\circ \end{aligned}\right\} \Rightarrow$ **? < ? < ?**

A) a < b < c < d B) d < b < c < a

C) a < d < c < b D) d < a < c < b

E) d < c < b < a

16. **$\tan\left(\dfrac{\cos^{-1}(0)}{2}\right)=?$**

A) $\sqrt{3}$ B) 0 C) $\frac{1}{\sqrt{3}}$

D) –1 E) 1

Yanıtlar / Answers

1. E	4. C	7. E	10. A	13. E	16. E
2. D	5. B	8. A	11. E	14. A	
3. D	6. C	9. E	12. B	15. E	

1. $\cos\left(\dfrac{3\pi}{2}+x\right)=\sin x$

Yanıt / Answer E

---

2. $0<x<\dfrac{\pi}{2} \Rightarrow \sin\left(\dfrac{3\pi}{2}-x\right)=-\cos x$

Yanıt / Answer D

---

4. $A=\sin\left(\dfrac{3\pi}{2}+x\right)+\cos(2\pi-x)-\tan(\pi-x)$

$=-\cos x+\cos x-(-\tan x)$

$=-(-\tan x)=\tan x$

Yanıt / Answer D

---

3. $f(x)=\cos\left(\dfrac{3\pi}{2}-x\right)-\sin(2\pi-x)+\cos(\pi+x)$

$=-\sin x+\sin x-\cos x=-\cos x$

$f(\dfrac{\pi}{2}+x)=-\cos(\dfrac{\pi}{2}+x)=\sin x$

Yanıt / Answer C

---

5. $\cos(\pi-x)+\sin\left(\dfrac{3\pi}{2}-x\right)=-\cos x-\cos x$

$=-2\cos x$

Yanıt / Answer B

6.

I. $\cot\left(\dfrac{\pi}{2}+x\right)=-\tan x$ [Yanlış / False]

II. $\sin\left(x-\dfrac{3\pi}{2}\right)=\cos x$ [Doğru / True]

III. $\cos(\pi-x)=-\cos x$ [Yanlış / False]

IV. $\tan\left(\dfrac{\pi}{2}+x\right)=-\cot x$ [Doğru / True]

V. $\sin(\pi-x)=\sin x$ [Doğru / True]

Yanıt / Answer C

---

7. $0<x<\dfrac{\pi}{2} \Rightarrow \begin{cases}\tan\left(\dfrac{\pi}{2}+x\right)=-\cot x\\ \cot(2\pi-x)=-\cot x\end{cases}$

$\tan\left(\dfrac{\pi}{2}+x\right)-\cot(2\pi-x)=-\cot x+\cot x=0$

Yanıt / Answer E

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8. $\begin{array}{r|l} 930° & 360° \\ -720° & 2 \\ \hline 210° & \end{array}$ $\begin{array}{r|l} 1020° & 360° \\ -720° & 2 \\ \hline 300° & \end{array}$ $\begin{array}{r|l} 405° & 360° \\ -360° & 1 \\ \hline 45° & \end{array}$

$$\frac{\sin 930°+\cos(-1020°)}{\cot 405°}=\frac{\sin 210°+\cos 60°}{\cot 45°}$$

$$=\frac{-\dfrac{1}{2}+\dfrac{1}{2}}{1}=0$$

Yanıt / Answer A

9. $A=\sin\dfrac{2\pi}{3}=\sin 120°$

A) $-\sin\dfrac{\pi}{6}\neq A$

B) $-\cos\dfrac{5\pi}{6}=-\cos 150°\neq A$

C) $\cos\dfrac{5\pi}{6}=\cos 150°\neq A$

D) $\sin\dfrac{\pi}{3}=\sin 60°=\sin 120°=A$

Yanıt / Answer D

10. $f(x)=\dfrac{\cos(\pi-x)-\sin\left(\dfrac{\pi}{2}+x\right)}{\tan\left(\dfrac{3\pi}{2}+x\right)}$

$f(x)=\dfrac{-\cos x-\cos x}{-\cot x}=\dfrac{-2\cos x}{-\dfrac{\cos x}{\sin x}}=2\sin x$

$f(\pi+x)=2\sin(\pi+x)=-2\sin x$

Yanıt / Answer A

11.

$$\begin{array}{r|l} 850° & 360° \\ \underline{-720°} & 2 \\ \mathbf{130°} & \end{array}\qquad \begin{array}{r|l} 660° & 360° \\ \underline{-360°} & 1 \\ \mathbf{300°} & \end{array}\qquad \begin{array}{r|l} 770° & 360° \\ \underline{-720°} & 2 \\ \mathbf{50°} & \end{array}$$

$A=\cos 850°+\sin(-660°)+\cos 770°$

$=\cos 130°-\sin 300°+\cos 50°$

$=-\cos 50+\sin 60°+\cos 50°$

$=\sin 60°=\dfrac{\sqrt{3}}{2}$

Yanıt / Answer E

12. $\cot 210°\cdot\tan 120°-\cos 240°$

$=\cot(180°+30°)\cdot\tan(180°-60°)-\cos(180°+60°)$

$=\cot 30°\cdot(-\tan 60°)-(-\cos 60°)$

$=\sqrt{3}\cdot(-\sqrt{3})+\dfrac{1}{2}=-3+\dfrac{1}{2}=\dfrac{-5}{2}$

Yanıt / Answer B

13. $\tan(-120°)=-\tan 120°$

$=-\tan(180°-60°)$

$=-(-\tan 60°)\ =\ \tan 60°=\sqrt{3}$

Yanıt / Answer E

14.

$$\left.\begin{array}{l} \sin 91° \ \rightarrow\ + \\ \cos 170° \ \rightarrow\ - \\ \tan 269° \ \rightarrow\ + \\ \cot 358° \ \rightarrow\ - \end{array}\right\}\Rightarrow\ +,\ -,\ +,\ -$$

Yanıt / Answer A

15.

$$\left.\begin{array}{l} a=\sin 151°=\sin 29° \\ b=\cos 151°=-\cos 29° \\ c=\tan 151°=-\tan 29° \\ d=\cot 151°=-\cot 29° \end{array}\right\}\Rightarrow\ d<c<b<a$$

Yanıt / Answer E

16. $\tan\left(\dfrac{\cos^{-1}(0)}{2}\right)=\tan\dfrac{90°}{2}=\tan 45°=1$

Yanıt / Answer E

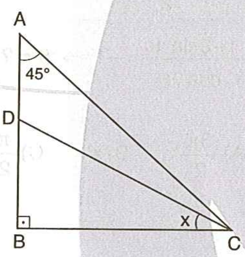
1. $\tan 20° = a \Rightarrow \dfrac{\tan 160° - \tan 110°}{1 + \tan 160° - \tan 110°} = ?$

A) $-\dfrac{1}{a}$ B) $-\dfrac{1+a}{a}$ C) $\dfrac{1-a^2}{2a}$

D) $\dfrac{1-a^2}{a}$ E) $\dfrac{a^2-1}{a^2-a-1}$

2. $|AD| = |DB|$

$\Rightarrow$ **$\cos x = ?$**

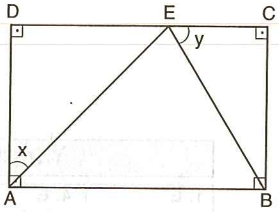


A) $\dfrac{1}{\sqrt{5}}$ B) $\dfrac{2}{\sqrt{5}}$ C) $\dfrac{3}{\sqrt{5}}$ D) $\dfrac{4}{\sqrt{5}}$ E) $\dfrac{5}{\sqrt{5}}$

3. $\tan x = \dfrac{4}{3}$, $\cot y = \dfrac{2}{3}$

$A(ABCD) = 72 \text{ cm}^2$

$\Rightarrow$ **$|AB| = ?$ cm**



A) 6 B) 8 C) 10 D) 12 E) 16

4. $\left(\dfrac{2\sin 50°}{\sin 40°} - \cot 40°\right) \cdot \tan 40° = ?$

A) 2sin40° B) –cos40° C) cos20°

D) cos40° E) 1°

5. ABCD bir dikdörtgendir.

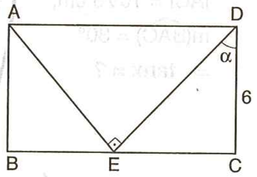
ABCD is a rectangle.

$m(\widehat{EDC}) = \alpha$,

$|DC| = 6$ cm,

$\cot\alpha = \dfrac{2}{3}$

$\Rightarrow$ **$A(ABCD) = ?$ cm^2**



A) 72 B) 78 C) 84 D) 96 E) 108

6. $x \in (0, \dfrac{\pi}{2})$

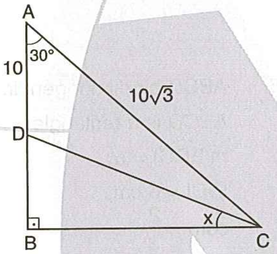
$\dfrac{\sin x}{\cos^2 x} + \dfrac{1}{1+\sin x} = 4 \Rightarrow$ **$x = ?$**

A) $\dfrac{\pi}{12}$ B) $\dfrac{\pi}{6}$ C) $\dfrac{\pi}{4}$ D) $\dfrac{\pi}{3}$ E) $\dfrac{5\pi}{12}$

7. $\left.\begin{aligned} a &= \sin 215^\circ \\ b &= \cos 140^\circ \\ c &= \cot 200^\circ \end{aligned}\right\} \Rightarrow$ **? < ? < ?**

A) $a < b < c$ B) $b < a < c$ C) $c < b < a$
D) $c < a < b$ E) $a < c < b$

8. $|AD| = 10$ cm,
$|AC| = 10\sqrt{3}$ cm,
$m(\widehat{BAC}) = 30^\circ$
$\Rightarrow$ **tanx = ?**



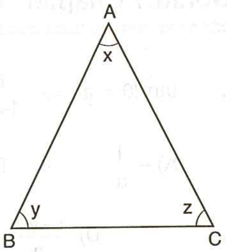
A) 1 B) $\frac{1}{\sqrt{2}}$ C) $\frac{1}{\sqrt{3}}$ D) $\frac{1}{2}$ E) $\frac{1}{3}$

9. $\frac{\pi}{2} < x < \pi$,

$-\frac{3}{\cos x} = \frac{2}{\sin x} \Rightarrow$ **cosx = ?**

A) $-\frac{1}{2\sqrt{13}}$ B) $-\frac{1}{\sqrt{13}}$ C) $-\frac{2}{\sqrt{13}}$
D) $-\frac{3}{\sqrt{13}}$ E) $-\frac{4}{\sqrt{13}}$

10. $m(\widehat{BAC}) = x$,
$m(\widehat{ABC}) = y$,
$m(\widehat{ACB}) = z$
$\Rightarrow$ **tanx + tan(y + z) = ?**



A) –1 B) –2 C) 0 D) 1 E) 2

11. $0 < \theta < \frac{\pi}{2}$,

$\frac{1 - 3\sin^2\theta}{\cos^2\theta} = -1 \Rightarrow \theta$ **= ?**

A) $\frac{3\pi}{2}$ B) π C) $\frac{\pi}{2}$ D) $\frac{\pi}{3}$ E) $\frac{\pi}{4}$

12. $x = \sin 17^\circ$, $y = \sin 87^\circ$
$z = \sin 107^\circ \Rightarrow$ **? < ? < ?**

A) $x < y < z$ B) $z < y < x$ C) $x < z < y$
D) $y < x < z$ E) $z < x < y$

Yanıtlar / Answers

1. E	4. E	7. B	10. C
2. B	5. B	8. C	11. E
3. D	6. D	9. D	12. C

1. $$\frac{\tan160°-\tan110°}{1+\tan160°-\tan110°}$$

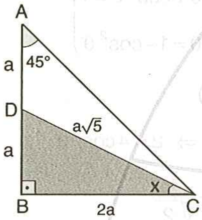
$$=\frac{\tan(180°-20°)-\tan(90°+20°)}{1+\tan(180°-20°)-\tan(90°+20°)}$$

$$=\frac{-\tan20°+\cot20°}{1-\tan20°+\cot20°}$$

$$=\frac{-a+\frac{1}{a}}{1-a+\frac{1}{a}}=\frac{a^2-1}{a^2-a-1}$$

Yanıt / Answer E

2.



$m(\widehat{A})=m(\widehat{C})=45°$

$|AB|=|BC|=2a$

$|DC|^2=|DB|^2+|BC|^2$

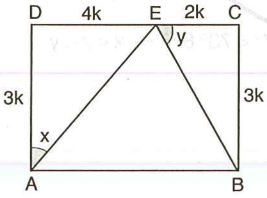
$=4a^2+a^2$

$|DC|=a\sqrt{5}$

$$\cos x=\frac{2a}{a\sqrt{5}}=\frac{2}{\sqrt{5}}$$

Yanıt / Answer B

3.



$$\tan x=\frac{4}{3}=\frac{|DE|}{|AD|}$$

$$\cot y=\frac{|EC|}{|BC|}=\frac{2}{3}$$

$A(ABCD)=3k\cdot6k \Rightarrow 72=18k^2$

$k^2=4$

$k=2$

$|AB|=6k=6\cdot2 \Rightarrow |AB|=12cm$

Yanıt / Answer D

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4. $$\left(\frac{2\sin50°}{\sin40°}-\cot40°\right)\cdot\tan40°$$

$$=\left(\frac{2\sin50°}{\sin40°}-\frac{\cos40°}{\sin40°}\right)\cdot\tan40°$$

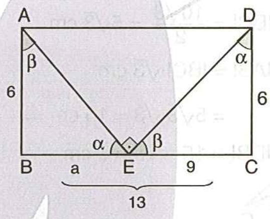
$$=\left(\frac{2\sin50°-\cos40°}{\sin40°}\right)\cdot\tan40°$$

$$=\left(\frac{2\cos40°-\cos40°}{\sin40°}\right)\cdot\tan40°$$

$$=\frac{\cos40°}{\sin40°}\cdot\frac{\sin40°}{\cos40°}=1$$

Yanıt / Answer E

5.



$$\cot\alpha=\frac{|DC|}{|EC|}$$

$$\frac{2}{3}=\frac{|DC|}{|EC|}$$

$$\Rightarrow \begin{cases}|DC|=2k\\|EC|=3k\end{cases}$$

$\Rightarrow 6=2k \Rightarrow k=3 \Rightarrow |EC|=9$

$\overset{\Delta}{ABE}\sim\overset{\Delta}{ECD} \Rightarrow$

$$\frac{6}{9}=\frac{a}{6} \Rightarrow a=4$$

$|BC|=4+9=13$

$A(ABCD)=6\cdot13=78\ cm^2$

Yanıt / Answer B

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6. $$\frac{\sin x}{\cos^2x}+\frac{1}{1+\sin x}=4$$

$$\frac{\sin x}{\cos^2x}+\frac{1-\sin x}{1-\sin^2x}=4$$

$$\frac{\sin x}{\cos^2x}+\frac{1-\sin x}{\cos^2x}=4$$

$$\frac{\sin x+1-\sin x}{\cos^2x}=4 \Rightarrow \cos^2x=\frac{1}{4}$$

$$\cos x=\pm\frac{1}{2}\quad x\in\left(0,\frac{\pi}{2}\right)\Rightarrow \cos x=\frac{1}{2}$$

$$x=\frac{\pi}{3}$$

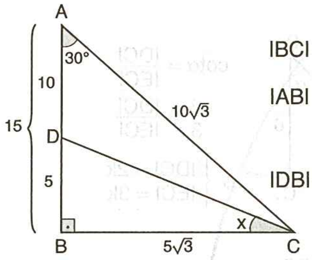
Yanıt / Answer D

7.

$$\left.\begin{aligned} a &= \sin 215° = \sin(180°+35°) = -\sin 35° \\ b &= \cos 140° = \cos(90°+50°) = -\sin 50° \\ c &= \cot 200° = \cot(270°-70°) = \tan 70° \end{aligned}\right\} \Rightarrow c > a > b$$

Yanıt / Answer B

8.



$$|BC| = \frac{10\sqrt{3}}{2} = 5\sqrt{3} \text{ cm}$$

$$|AB| = |BC| \cdot \sqrt{3} \text{ cm}$$

$$= 5\sqrt{3} \cdot \sqrt{3} = 15 \text{ cm} \Rightarrow$$

$$|DB| = 15 - 10 = 5 \text{ cm}$$

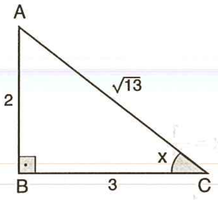
$$\perp \overset{\Delta}{BDC} \Rightarrow$$

$$\tan x = \frac{|DB|}{|BC|} = \frac{5}{5\sqrt{3}} = \frac{1}{\sqrt{3}}$$

Yanıt / Answer C

9.

$$-\frac{3}{\cos x} = \frac{2}{\sin x} \Rightarrow \frac{\sin x}{\cos x} = -\frac{2}{3} \Rightarrow \tan x = -\frac{2}{3}$$



$$\tan x = \frac{|AB|}{|BC|} = \frac{2}{3}$$

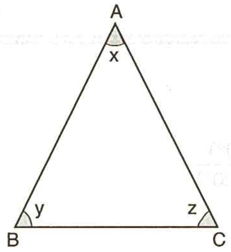
$$|AC|^2 = 4 + 9 = 13$$

$$|AC| = \sqrt{13}$$

$$\frac{\pi}{2} < x < \pi \Rightarrow \cos x = -\frac{3}{\sqrt{13}}$$

Yanıt / Answer D

10.



$$x + y + z = \pi$$

$$\Rightarrow y + z = \pi - x$$

$$\tan x + \tan(y+z) = \tan x + \tan(\pi - x) = \tan x - \tan x = 0$$

Yanıt / Answer C

11.

$$\frac{1-3\sin^2\theta}{\cos^2\theta} = -1, \quad \left(\begin{aligned} &\sin^2\theta + \cos^2\theta = 1 \\ &\sin^2\theta = 1 - \cos^2\theta \end{aligned}\right)$$

$$-\cos^2\theta = 1 - 3(1-\cos^2\theta)$$

$$-\cos^2\theta = 1 - 3 + 3\cos^2\theta \Rightarrow 2 = 4\cos^2\theta$$

$$\cos^2\theta = \frac{1}{2} \Rightarrow \cos\theta = \frac{1}{\sqrt{2}}$$

$$\Rightarrow \theta = \frac{\pi}{4}, \quad (0 < x < \frac{\pi}{2})$$

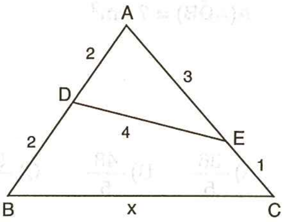
Yanıt / Answer E

12.

$$\left.\begin{aligned} x &= \sin 170° \\ y &= \sin 87° \\ z &= \sin 73° \end{aligned}\right\} \Rightarrow 17° < 73° \; 87° \Rightarrow x < z < y$$

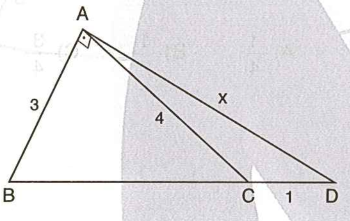
Yanıt / Answer C

1. **$|BC| = x = ?$ cm**


A
2
3
D
4
E
2
1
B
x
C

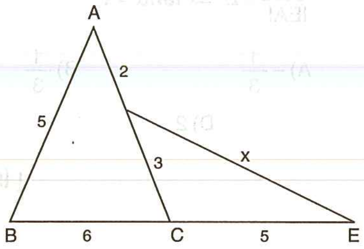
A) $2\sqrt{5}$ B) $4\sqrt{5}$ C) $2\sqrt{10}$
D) $4\sqrt{10}$ E) $5\sqrt{10}$

2. **$|AD| = x = ?$ cm**



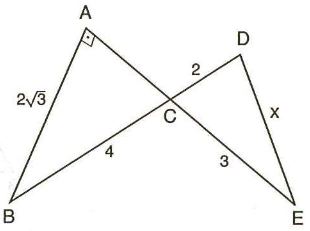
A) $\sqrt{\frac{112}{5}}$ B) $\sqrt{\frac{117}{5}}$ C) $\sqrt{\frac{123}{5}}$
D) $\sqrt{\frac{128}{5}}$ E) $\sqrt{\frac{129}{5}}$

3. **$x = ?$ cm**


A
2
5
3
x
B
6
C
5
E

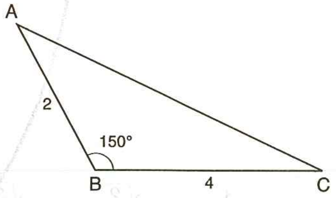
A) $2\sqrt{13}$ B) $4\sqrt{13}$ C) $\sqrt{\frac{68}{5}}$
D) $\sqrt{\frac{96}{5}}$ E) $\sqrt{\frac{112}{5}}$

4. **$x = ?$ cm**


A
D
2
$2\sqrt{3}$
C
x
4
3
B
E

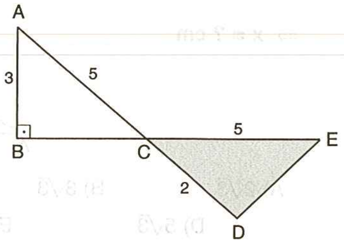
A) $\sqrt{3}$ B) 2 C) $\sqrt{5}$ D) $\sqrt{6}$ E) $\sqrt{7}$

5. **$A(\overset{\Delta}{ABC}) = ?\ \text{cm}^2$**



A) 2 B) 3 C) 4 D) 6 E) 8

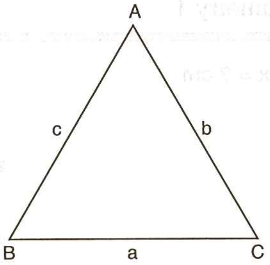
6. **$A(\overset{\Delta}{CDE}) = ?\ \text{cm}^2$**



A) 2 B) 3 C) 4 D) 5 E) 10

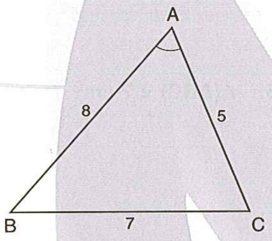
7. $a^2 = b^2 + c^2 + bc$

$\Rightarrow$ **$\sin\widehat{A} = ?$**



A) $\frac{\sqrt{2}}{2}$ B) $\frac{1}{2}$ C) $\frac{\sqrt{3}}{2}$ D) $\frac{1}{4}$ E) $\frac{2}{3}$

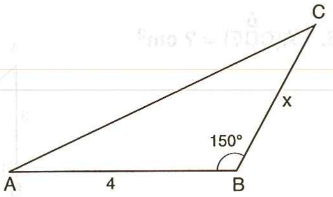
8. **$\sin\widehat{A} = ?$**



A) $\frac{1}{2}$ B) $\frac{\sqrt{2}}{2}$ C) $\frac{\sqrt{3}}{4}$ D) $\frac{\sqrt{3}}{2}$ E) $\frac{1}{4}$

9. $A(\overset{\Delta}{ABC}) = 6\sqrt{3}$ cm^2

$\Rightarrow$ **x = ? cm**

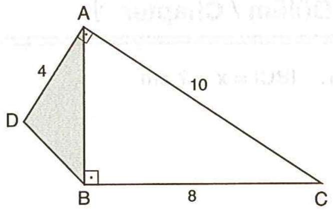


A) $2\sqrt{3}$ B) $3\sqrt{3}$ C) $4\sqrt{3}$ D) $5\sqrt{3}$ E) $6\sqrt{3}$

10. $[AD] \perp [AC]$,

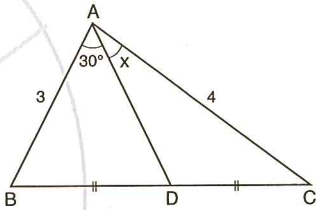
$[AB] \perp [BC] \Rightarrow$

$A(\overset{\Delta}{ADB}) = ?$ cm^2



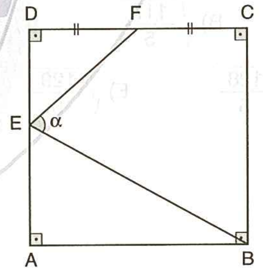
A) $\frac{36}{5}$ B) $\frac{48}{5}$ C) $\frac{52}{5}$ D) $\frac{63}{10}$ E) $\frac{67}{10}$

11. **$\sin x = ?$**



A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) $\frac{3}{4}$ D) $\frac{3}{5}$ E) $\frac{3}{8}$

12.



$m(\widehat{BEF}) = \alpha$, $|DF| = |FC|$, $|AB| = |BC| = |CD| = |DA|$

$\frac{|DE|}{|EA|} = 2 \Rightarrow$ **$\tan\alpha = ?$**

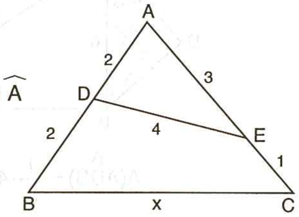
A) $-\frac{1}{3}$ B) $\frac{1}{3}$ C) $\frac{2}{3}$ D) 2 E) 3

[İSTANBUL ÜNV. YÖS 2013]

Yanıtlar / Answers

1. C	4. E	7. C	10. A
2. B	5. A	8. D	11. E
3. A	6. B	9. E	12. E

1. $\overset{\Delta}{ADE}$



$4^2 = 2^2 + 3^2 - 2 \cdot 2 \cdot 3 \ \cos \widehat{A}$

$16 = 4 + 9 - 12\cos \widehat{A}$

$\cos \widehat{A} = -\dfrac{1}{4}$

$\overset{\Delta}{ABC}$

$x^2 = 4^2 + 4^2 - 2 \cdot 4 \cdot 4 \cos \widehat{A}$

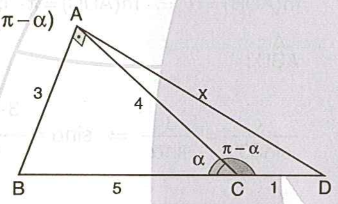
$= 16 + 16 - 32 \cdot \left(-\dfrac{1}{4}\right) = 32 + 8 = 40 \ \Rightarrow \ x = 2\sqrt{10}$

Yanıt / Answer C

2. $\perp \overset{\Delta}{ABC} \Rightarrow \cos\alpha = \dfrac{4}{5}$

$\overset{\Delta}{ACD}$:

$x^2 = 4^2 + 1^2 - 2 \cdot 4 \cdot 1\cos(\pi - \alpha)$



$x^2 = 16 + 1 + 8\cos\alpha$

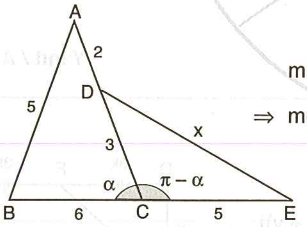
$x^2 = 17 + 8 \cdot \dfrac{4}{5}$

$x^2 = \dfrac{85 + 32}{5}$

$x^2 = \dfrac{117}{5} \ \Rightarrow \ x = \sqrt{\dfrac{117}{5}}$

Yanıt / Answer B

3.



$m(\widehat{ACB}) = \alpha$

$\Rightarrow m(\widehat{DCE}) = \pi - \alpha$

$\overset{\Delta}{ABC}$:

$5^2 = 6^2 + 5^2 - 2 \cdot 6 \cdot 5\cos\alpha$

$25 = 36 + 25 - 60\cos\alpha$

$\cos\alpha = \dfrac{36}{60} = \dfrac{6}{10} = \dfrac{3}{5}$

$\overset{\Delta}{DEC}$:

$x^2 = 3^2 + 5^2 - 2 \cdot 3 \cdot 5\cos(\pi - \alpha)$

$x^2 = 9 + 25 + 30\cos\alpha$

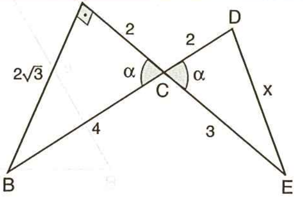
$x^2 = 34 + 30 \cdot \dfrac{3}{5}$

$x^2 = 34 + 18 \ \Rightarrow \ x^2 = 52$

$\Rightarrow \ x = 2\sqrt{13}$

Yanıt / Answer A

4. $m(\widehat{ACB}) = m(\widehat{DCE}) = \alpha$



$|AC|^2 = 16 - 12 = 4$

$\Rightarrow \ |AC| = 2$

$\perp \overset{\Delta}{ABC}: \ \cos\alpha = \dfrac{2}{4} = \dfrac{1}{2}$

$\overset{\Delta}{DCE}$:

$x^2 = 2^2 + 3^2 - 2 \cdot 2 \cdot 3\cos x$ (kosinüs teoremi / the cosinus theorem)

$x^2 = 4 + 9 - 12 \cdot \dfrac{1}{2}$

$x^2 = 13 - 6 = 7 \ \Rightarrow \ x = \sqrt{7}$

Yanıt / Answer E

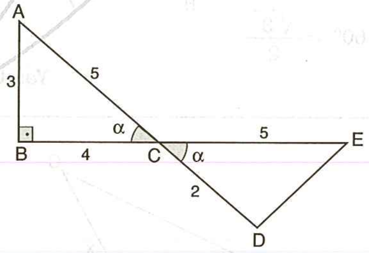
5. $A(\overset{\Delta}{ABC}) = \dfrac{1}{2} \cdot |AB| \cdot |AC| \cdot \sin 150°$

$= \dfrac{1}{2} \cdot 2 \cdot 4 \cdot \dfrac{1}{2}$

$= 2$

Yanıt / Answer A

6.

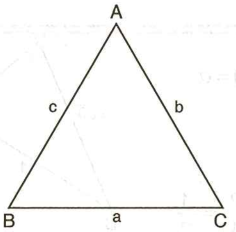


$A(\overset{\Delta}{CDE}) = \dfrac{1}{2} \cdot |CD| \cdot |CE| \cdot \sin\alpha$

$= \dfrac{1}{2} \cdot 2 \cdot 5 \cdot \dfrac{3}{5} = 3$

Yanıt / Answer C

7.



$\overset{\Delta}{ABC}$:

$a^2=b^2+c^2-2bc\ \cos\widehat{A}$ (kosinüs teoremi / the cosinus theorem)

$b^2+c^2+bc=b^2+c^2-2bc\ \cos\widehat{A}$

$\Rightarrow\ bc=-2bc\ \cos\widehat{A}$

$\cos\widehat{A}=-\dfrac{1}{2}$

$m(\widehat{A})=120°$

$\sin\widehat{A}=\sin120°\ =\sin60°=\dfrac{\sqrt{3}}{2}$

Yanıt / Answer C

---

8. $\overset{\Delta}{ABC}$:

$7^2=5^2+8^2-2\cdot5\cdot8\ \cos\widehat{A}$ (kosinüs teoremi / the cosinus theorem)

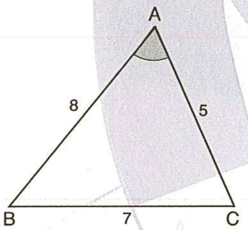
$49=25+64-80\ \cos\widehat{A}$

$80\cos\widehat{A}\ =40$

$\cos\widehat{A}\ =\dfrac{1}{2}$

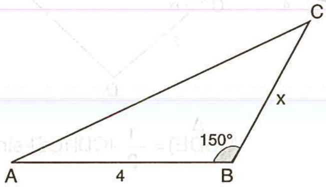
$m(\widehat{A})=60°$

$\sin\widehat{A}\ =\sin60°\ \ =\dfrac{\sqrt{3}}{2}$



Yanıt / Answer D

9.



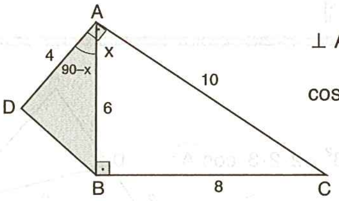
$A(\overset{\Delta}{ABC})=\dfrac{1}{2}|BC|\cdot|AB|\ \ \sin150°$

$6\sqrt{3}\ =\dfrac{1}{2}\cdot4\cdot x\sin150°\ \Rightarrow\ 6\sqrt{3}\ =2x\sin30°$

$6\sqrt{3}\ =2\cdot x\cdot\dfrac{1}{2}\ \ \Rightarrow\ x=6\sqrt{3}$

Yanıt / Answer E

10.



$\perp\overset{\Delta}{ABC}\ \Rightarrow$

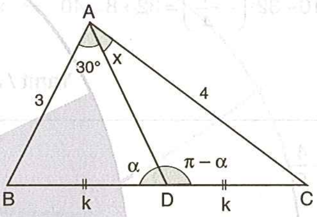
$\cos x=\dfrac{6}{10}=\dfrac{3}{5}$

$A(\overset{\Delta}{ADB})=\dfrac{1}{2}\cdot4\cdot6\sin(90°-\alpha)$

$=2\cdot6\cos\alpha=12\cdot\dfrac{3}{5}=\dfrac{36}{5}$

Yanıt / Answer A

11.



$m(\widehat{ADB})=\alpha\ \Rightarrow\ m(\widehat{ADC})=\pi-\alpha$

$\overset{\Delta}{ABD}$:

$\dfrac{k}{\sin30°}=\dfrac{3}{\sin\alpha}\ \Rightarrow\ \sin\alpha=\dfrac{3\cdot\frac{1}{2}}{k}=\dfrac{3}{2k}$ (sinüs teoremi / the sinus theorem)

$\overset{\Delta}{ADC}$:

$\dfrac{k}{\sin x}=\dfrac{4}{\sin(\pi-\alpha)}\ \Rightarrow\ \dfrac{k}{\sin x}=\dfrac{4}{\sin\alpha}$ (sinüs teoremi / the sinus theorem)

$\dfrac{k}{\sin x}=\dfrac{4}{\frac{3}{2k}}\ \Rightarrow\ \dfrac{k}{\sin x}=\dfrac{8k}{3}\ \Rightarrow\ \sin x=\dfrac{3}{8}$

Yanıt / Answer E

12.

$x + y + \alpha = 180°$

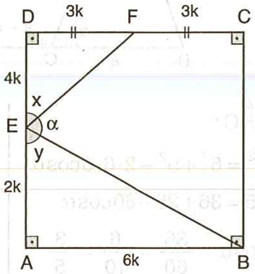
$\alpha = 180 - (x + y)$

$\tan\alpha = \tan\ [180° - (x + y)]$

$$-\frac{\tan x+\tan y}{1-\tan x\cdot\tan y}=-\frac{\frac{3}{4}+3}{1-\frac{9}{4}}$$

$$=-\frac{\frac{15}{4}}{-\frac{5}{4}}$$

$$=3$$



Yanıt / Answer E

TRİGONOMETRİ
TRIGONOMETRY 2

BÖLÜM
CHAPTER
2

Trigonometri / Trigonometry 2

Test 1

1. $\sin 15° = A \Rightarrow$ **A = ?**

A) $\dfrac{\sqrt{3}-\sqrt{2}}{2}$ B) $\dfrac{\sqrt{3}+\sqrt{2}}{2}$

C) $\dfrac{\sqrt{6}-\sqrt{2}}{4}$ D) $\dfrac{\sqrt{6}+\sqrt{2}}{4}$

E) $\dfrac{\sqrt{6}+\sqrt{2}}{2}$

2. $\sin 17° \cdot \cos 13° + \cos 17° \cdot \sin 13° = A \Rightarrow$ **A = ?**

A) $\dfrac{1}{2}$ B) $\dfrac{\sqrt{2}}{2}$ C) $\dfrac{\sqrt{3}}{2}$ D) 1 E) 0

3. $\sin(\dfrac{5\pi}{8}+x)\cdot\cos(\dfrac{\pi}{8}+x)-\sin(\dfrac{\pi}{8}+x)\cdot\cos(\dfrac{5\pi}{8}+x)=?$

A) $\dfrac{1}{2}$ B) 1 C) $\sin(\dfrac{\pi}{3}-x)$

D) $\cos(\dfrac{\pi}{3}-x)$ E) $\dfrac{\sqrt{3}}{2}$

4. $\dfrac{\sin 2x}{\sin x}-\dfrac{\cos 2x}{\cos x}=?$

A) $-\dfrac{1}{\cos x}$ B) $\dfrac{1}{\cos x}$ C) $\dfrac{1}{2\cos x}$

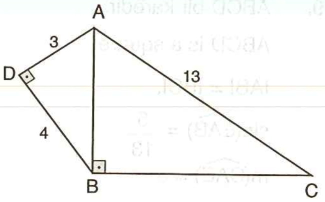
D) $\dfrac{2}{\cos x}$ E) $\dfrac{1}{\sin x \cdot \cos x}$

5. $A = \sin(x+25°)\cdot\cos(x-35°) - \sin(x-35°)\cdot\cos(x+25°)$

$\Rightarrow$ **A = ?**

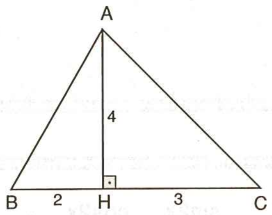
A) $\dfrac{-\sqrt{3}}{2}$ B) $-\dfrac{1}{2}$ C) $\dfrac{1}{2}$ D) $\dfrac{\sqrt{2}}{2}$ E) $\dfrac{\sqrt{3}}{2}$

6. $\sin(\widehat{CAD}) = ?$



A) $\dfrac{5}{13}$ B) $\dfrac{4}{13}$ C) $\dfrac{12}{13}$ D) $\dfrac{7}{65}$ E) $\dfrac{56}{65}$

7. $\tan(\widehat{BAC}) = ?$



A) $\frac{1}{2}$ B) 1 C) $\frac{3}{2}$ D) 2 E) $\frac{5}{2}$

8. ABCD bir karedir.

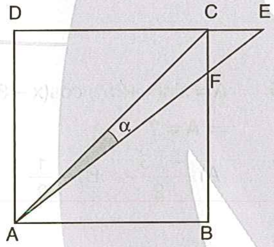
ABCD is a square.

$|AB| = |BC|$,

$|DE| = 5 \cdot |CE|$,

$m(\widehat{CAE}) = \alpha$

$\Rightarrow$ **$\tan\alpha$ = ?**



A) $\frac{1}{5}$ B) $\frac{1}{6}$ C) $\frac{1}{7}$ D) $\frac{1}{8}$ E) $\frac{1}{9}$

9. ABCD bir karedir.

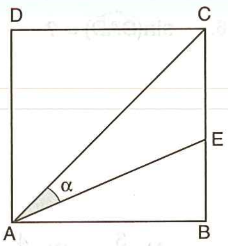
ABCD is a square.

$|AB| = |BC|$,

$\sin(\widehat{EAB}) = \frac{5}{13}$

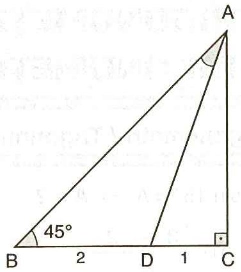
$m(\widehat{CAE}) = \alpha$

$\Rightarrow$ **$\tan\alpha$ = ?**



A) $\frac{4}{17}$ B) $\frac{6}{17}$ C) $\frac{7}{17}$ D) $\frac{8}{17}$ E) $\frac{9}{17}$

10. $\tan(\widehat{BAD}) = ?$



A) $\frac{1}{2}$ B) 1 C) $\frac{3}{2}$ D) 2 E) $\frac{5}{2}$

11. $\dfrac{\mathbf{\sin 3x}}{\mathbf{\cos x}} + \dfrac{\mathbf{\cos 3x}}{\mathbf{\sin x}} = ?$

A) sin4x B) cos4x C) 2·tan2x

D) 2·cot2x E) 2·cos4x

12. $\tan(x + 45°) = 2$

$\Rightarrow$ **$\sin x$ = ?**

A) $\frac{1}{\sqrt{10}}$ B) $\frac{1}{3}$ C) $\frac{1}{2}$

D) $\frac{2}{\sqrt{10}}$ E) $\frac{3}{\sqrt{10}}$

[İSTANBUL ÜNV. YÖS 2013]

Yanıtlar / Answers

1. C	4. B	7. D	10. A
2. A	5. E	8. E	11. D
3. B	6. E	9. C	12. A

1. $A=\sin 15°=\sin(60°-45°)$

$$=\sin 60°\cdot\cos 45°-\sin 45°\cdot\cos 60°$$

$$=\frac{\sqrt{3}}{2}\cdot\frac{\sqrt{2}}{2}-\frac{\sqrt{2}}{2}\cdot\frac{1}{2}$$

$$=\frac{\sqrt{6}}{4}-\frac{\sqrt{2}}{4}$$

$$=\frac{\sqrt{6}-\sqrt{2}}{4}$$

Yanıt / Answer C

---

2. $A=\sin 17°\cdot\cos 13°+\cos 17°\cdot\sin 13°$

$$=\sin(17°+13°)$$

$$=\sin 30°=\frac{1}{2}$$

Yanıt / Answer A

---

3. $\sin\left(\frac{5\pi}{8}+x\right)\cdot\cos\left(\frac{\pi}{8}+x\right)-\sin\left(\frac{\pi}{8}+x\right)\cdot\cos\left(\frac{5\pi}{8}+x\right)$

$$=\sin\left(\frac{5\pi}{8}+x-\frac{\pi}{8}-x\right)=\sin\left(\frac{4\pi}{8}\right)=\sin\frac{\pi}{2}=1$$

Yanıt / Answer B

---

4. $\underset{(\cos x)}{\frac{\sin 2x}{\sin x}}-\underset{(\sin x)}{\frac{\cos 2x}{\cos x}}=\frac{\sin 2x\cdot\cos x-\cos 2x\cdot\sin x}{\sin x\cdot\cos x}$

$$=\frac{\sin(2x-x)}{\sin x\cdot\cos x}=\frac{\sin x}{\sin x\cdot\cos x}=\frac{1}{\cos x}$$

Yanıt / Answer B

---

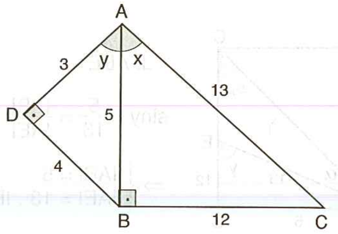
5. $A=\sin(x+25°)\cdot\cos(x-35°)-\sin(x-35°)\cdot\cos x+25°)$

$$=\sin(x+25°-x+35°)$$

$$=\sin 60°=\frac{\sqrt{3}}{2}$$

Yanıt / Answer E

6.



$$\sin(\widehat{CAD})=\sin(x+y)$$

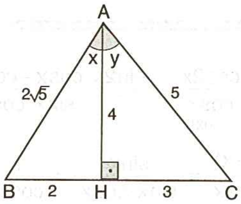
$$=\sin x\cdot\cos y+\sin y\cdot\cos x$$

$$=\frac{12}{13}\cdot\frac{3}{5}+\frac{4}{5}\cdot\frac{5}{13}$$

$$=\frac{36}{65}+\frac{20}{65}=\frac{56}{65}$$

Yanıt / Answer E

7.



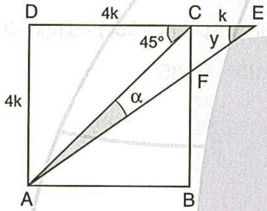
$$\tan(\widehat{BAC})=\tan(x+y)=\frac{\tan x+\tan y}{1-\tan x\cdot\tan y}$$

$$=\frac{\frac{2}{4}+\frac{3}{4}}{1-\frac{2}{4}\cdot\frac{3}{4}}=\frac{\frac{5}{4}}{1-\frac{6}{16}}$$

$$=\frac{5}{4}\cdot\frac{16}{10}=\frac{5\cdot4}{10}=2$$

Yanıt / Answer D

8.

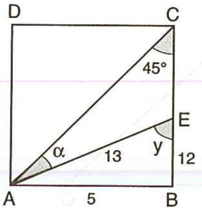


$$\tan\alpha=\tan(45°-y)$$

$$=\frac{\tan45°-\tan y}{1+\tan45°\cdot\tan y}=\frac{1-\frac{4}{5}}{1+\frac{4}{5}}=\frac{\frac{1}{5}}{\frac{9}{5}}=\frac{1}{9}$$

Yanıt / Answer E

9.



$\perp \overset{\Delta}{ABE} \Rightarrow$

$$\sin y=\frac{5}{13}=\frac{|AB|}{|AE|}$$

$$\Rightarrow \begin{cases}|AB|=5\\ |AE|=13,\ |EB|=12\end{cases}$$

$\overset{\Delta}{ACE} \Rightarrow\ y=\alpha+45° \Rightarrow \alpha=y-45° \Rightarrow$

$$\tan\alpha=(\tan45°-y)=\frac{\tan45°-\tan y}{1+\tan45°\cdot\tan y}$$

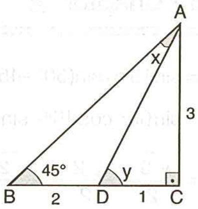
$$=\frac{1-\frac{5}{12}}{1+\frac{5}{12}}=\frac{\frac{7}{12}}{\frac{17}{12}}\Rightarrow\frac{7}{17}$$

Yanıt / Answer C

10. $m(\widehat{BAD})=x$

$\Rightarrow y=45°+x$

$x=y-45°$



$$\tan x=\tan(y-45°)=\frac{\tan y-\tan45°}{1+\tan y\cdot\tan45°}$$

$$=\frac{3-1}{1+3\cdot1}=\frac{2}{4}=\frac{1}{2}$$

Yanıt / Answer A

11.

$$A=\underset{(\sin x)}{\frac{\sin3x}{\cos x}}+\underset{(\cos x)}{\frac{\cos3x}{\sin x}}$$

$$=\frac{\sin3x\cdot\sin x+\cos3x\cdot\cos x}{\cos x\cdot\sin x}$$

$$=\frac{\cos(3x-x)}{\cos x\cdot\sin x}$$

$$=\frac{\cos2x}{\frac{1}{2}\cdot2\cos x\cdot\sin x}$$

$$=\frac{2\cos2x}{\sin2x}=2\cot2x$$

Yanıt / Answer D

12.

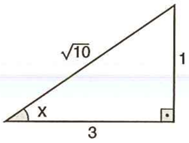
$$\tan(x+45°)=\frac{\tan x+\tan45°}{1-\tan x\cdot\tan45°}$$

$\tan x=t \Rightarrow$

$t+1=2-2t$

$3t=1$

$t=\frac{1}{3}$



$\Rightarrow \sin x=\frac{1}{\sqrt{10}}$

$\tan x=\frac{1}{3}$

Yanıt / Answer A

1. $\cos^2 75° - \sin^2 75° = A \Rightarrow$ **A = ?**

A) $-\frac{\sqrt{3}}{2}$ B) $-\frac{1}{2}$ C) 1 D) $\frac{1}{2}$ E) $\frac{\sqrt{3}}{2}$

2. $\cos 20° = x \Rightarrow$ **sin 130° = ?**

A) $1 - 2x^2$ B) $2x^2 - 1$ C) $2x^2 + 1$ D) $x^2 - 1$ E) $x^2 + 1$

3. $\sin 76° = x \Rightarrow$ **cos 7° = ?**

A) $\frac{x-1}{2}$ B) $\frac{x+1}{2}$ C) $\frac{x^2+1}{2}$ D) $\sqrt{\frac{x+1}{2}}$ E) $\sqrt{\frac{x-1}{2}}$

4. $\mathbf{\sin\frac{15°}{2} \cdot \cos\frac{15°}{2} \cdot \cos 15° = ?}$

A) $\frac{1}{2}$ B) $\frac{1}{4}$ C) $\frac{1}{8}$ D) $\frac{1}{16}$ E) $\frac{1}{32}$

5. $0 < x < \frac{\pi}{2}$, $\tan 2x = \frac{4}{3} \Rightarrow$ **cos x = ?**

A) $\frac{1}{\sqrt{5}}$ B) $\frac{2}{\sqrt{5}}$ C) $\frac{3}{\sqrt{5}}$ D) $\frac{4}{\sqrt{5}}$ E) 1

6. $\sin x - \cos x = \frac{2}{3} \Rightarrow$ **sin 2x = ?**

A) $\frac{4}{9}$ B) $\frac{5}{9}$ C) $\frac{2}{3}$ D) $\frac{7}{9}$ E) $\frac{8}{9}$

7. $\pi < x < \frac{3\pi}{2}$, $3\sin x = -\sqrt{3} \Rightarrow$ **tan 2x = ?**

A) $2\sqrt{2}$ B) $\sqrt{2}$ C) $\sqrt{5}$ D) $\sqrt{3}$ E) $2\sqrt{3}$

8. $x \in \left(0, \frac{\pi}{2}\right)$

$\tan x = 3 \Rightarrow$ **cos 2x = ?**

A) $-\frac{4}{5}$ B) $-\frac{3}{5}$ C) $-\frac{2}{5}$ D) $\frac{3}{5}$ E) $\frac{4}{5}$

9. $A = 10 - 8\sin 2x \cdot \cos 2x \Rightarrow$ **min (A) = ?**

A) 10 B) 8 C) 6 D) 4 E) 2

10. $\left.\begin{array}{l} \frac{3\pi}{4} < x < \pi \\ \sin x + \cos x = \frac{1}{2} \end{array}\right\} \Rightarrow$ **cos2x = ?**

A) $\frac{\sqrt{7}}{4}$ B) $\frac{\sqrt{7}}{3}$ C) $\frac{\sqrt{7}}{2}$

D) $\sqrt{7}$ E) $2\sqrt{7}$

11. **cot 15° − tan15° = ?**

A) $-2\sqrt{3}$ B) $-\sqrt{3}$ C) 0

D) $\sqrt{3}$ E) $2\sqrt{3}$

12. $x \in (0, \frac{\pi}{2})$,

$\frac{3 - 6\sin^2 x}{\tan x + \cot x} = \frac{3}{8} \Rightarrow$ **x = ?**

A) $\frac{\pi}{24}$ B) $\frac{\pi}{12}$ C) $\frac{\pi}{8}$ D) $\frac{\pi}{4}$ E) $\frac{\pi}{3}$

13. $\frac{\sin 4x + 2\sin 2x}{4 \cdot \cos^3 x} = \frac{4}{5} \Rightarrow$ **sinx = ?**

A) $\frac{1}{5}$ B) $\frac{2}{5}$ C) $\frac{2}{25}$ D) $\frac{4}{25}$ E) $\frac{8}{25}$

14. $x \in \left(0, \frac{\pi}{2}\right)$

$\cot 2x = 2\cos 2x \Rightarrow$ **$\tan^2 x - \cot^2 x$ = ?**

A) $-8\sqrt{3}$ B) -8 C) $-4\sqrt{3}$

D) -9 E) -12

15. $\sin x = 0{,}6 \Rightarrow$ **sin2x = ?**

A) $\frac{25}{24}$ B) $\frac{4}{3}$ C) $\frac{6}{5}$

D) $\frac{3}{4}$ E) $\frac{24}{25}$

[YTÜ. YÖS 2012]

Yanıtlar / Answers

1. A	4. C	7. A	10. A	13. B
2. B	5. B	8. A	11. E	14. A
3. D	6. B	9. C	12. A	15. E

1. $\cos 2a = \cos^2 a - \sin^2 a$

$\cos 150° = \cos^2 75° - \sin^2 75°$

$= \cos(180° - 30°)$

$\Rightarrow -\cos 30° = -\frac{\sqrt{3}}{2}$

Yanıt / Answer A

2. $\sin 130° = \sin(90° + 40°)$

$= \cos 40° \quad [\cos 2a = 2\cos^2 a - 1]$

$= 2\cos^2 20° - 1$

$= 2x^2 - 1$

Yanıt / Answer B

3. $\sin 76° = \sin(90° - 14°)$

$= \cos 14° = x \quad [\cos 2a = 2\cos^2 a - 1]$

$= 2\cos^2 7° - 1$

$x + 1 = 2 \cdot \cos^2 7°$

$\cos^2 7° = \frac{x+1}{2} \Rightarrow \cos 7° = \sqrt{\frac{x+1}{2}}$

Yanıt / Answer D

4. $A = \sin\frac{15°}{2} \cdot \cos\frac{15°}{2} \cdot \cos 15°$

$= \frac{1}{2} \cdot 2\sin\frac{15°}{2} \cdot \cos\frac{15°}{2} \cdot \cos 15°$

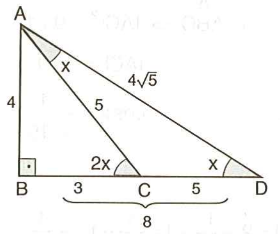
$= \frac{1}{2} \sin 15° \cdot \cos 15°$

$= \frac{1}{2} \cdot \frac{1}{2} \cdot 2\sin 15° \cdot \cos 15°$

$= \frac{1}{4} \sin 30° = \frac{1}{4} \cdot \frac{1}{2} = \frac{1}{8}$

Yanıt / Answer C

5.



$\perp \overset{\Delta}{ABD} \Rightarrow |AD|^2 = 8^2 + 4^2 = 80 \Rightarrow |AD| = 4\sqrt{5}$

$\perp \overset{\Delta}{ABD} \Rightarrow \cos x = \frac{|BD|}{|AD|} = \frac{8}{4\sqrt{5}} = \frac{2}{\sqrt{5}}$

Yanıt / Answer B

6. $\sin x - \cos x = \frac{2}{3}$

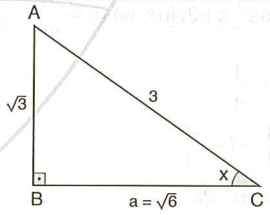
$(\sin x - \cos x)^2 = \left(\frac{2}{3}\right)^2$

$\underbrace{\sin^2 x + \cos^2 x}_{1} - 2\sin x \cdot \cos x = \frac{4}{9}$

$1 - \sin 2x = \frac{4}{9} \Rightarrow \sin 2x = 1 - \frac{4}{9} = \frac{5}{9}$

Yanıt / Answer B

7.



$3\sin x = -\sqrt{3} \Rightarrow \sin x = \frac{-\sqrt{3}}{3}$

$|AC|^2 = |AB|^2 + |BC|^2$ [Pisagor / Pythagorean]

$3^2 = (\sqrt{3})^2 + a^2$

$9 = 3 + a^2$

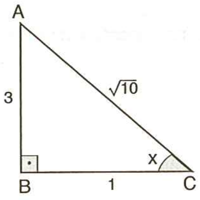
$a^2 = 6 \Rightarrow a = \sqrt{6}$

$x \in \left(\pi, \frac{3\pi}{2}\right) \Rightarrow \tan x = \frac{\sqrt{3}}{\sqrt{6}} = \frac{1}{\sqrt{2}}$

$\tan 2x = \frac{2\tan x}{1 - \tan^2 x} = \frac{\frac{2}{\sqrt{2}}}{1 - \frac{1}{2}} = \frac{\sqrt{2}}{\frac{1}{2}} = 2\sqrt{2}$

Yanıt / Answer A

8.



$$\tan x=\frac{|AB|}{|BC|}=\frac{3}{1}$$

$$\perp \overset{\Delta}{ABC} \Rightarrow |AC|^2=9+1$$

$$|AC|=\sqrt{10}$$

$$\cos x=\frac{1}{\sqrt{10}}$$

$$\cos 2x=2\cos^2 x-1$$

$$=2\left(\frac{1}{\sqrt{10}}\right)^2-1=2\cdot\frac{1}{10}-1=\frac{1}{5}-1=\frac{-4}{5}$$

Yanıt / Answer A

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9. $A=10-8\ \sin 2x\cdot\cos 2x=10-4\cdot 2\sin 2x\cdot\cos 2x$

$$=10-4\ \sin 4x$$

$$-1\le \sin 4x\le 1$$

$$-4\le -4\sin 4x\le 4$$

$$6\le 10-4\sin 4x\le 14$$

$$6\le A\le 14 \Rightarrow \min(A)=6$$

Yanıt / Answer C

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10. $\sin x+\cos x=\frac{1}{2}$

$$(\sin x+\cos x)^2=\left(\frac{1}{2}\right)^2$$

$$\underbrace{\sin^2 x+\cos^2 x}_{1}+2\sin x\cdot\cos x=\frac{1}{4}$$

$$1+\sin 2x=\frac{1}{4}$$

$$\sin 2x=\frac{1}{4}-1=\frac{-3}{4}$$

$$\cos^2 2x+\sin^2 2x=1$$

$$\cos^2 2x+\frac{9}{16}=1 \Rightarrow \cos^2 2x=1-\frac{9}{16}$$

$$\cos^2 2x=\frac{7}{16} \Rightarrow \cos 2x=\pm\frac{\sqrt{7}}{4}$$

$$x<\frac{3\pi}{2} \Rightarrow \cos 2x=\frac{-\sqrt{7}}{4}$$

Yanıt / Answer A

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11. $\underset{(\cos 15°)}{\frac{\cos 15°}{\sin 15°}}-\underset{(\sin 15°)}{\frac{\sin 15°}{\cos 15°}}=\frac{\cos^2 15°-\sin^2 15°}{\sin 15°\cdot\cos 15°}$

$$=\frac{\cos 30°}{\frac{1}{2}\sin 30°}=\frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}\cdot\frac{1}{2}}=2\sqrt{3}$$

Yanıt / Answer E

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12. $\dfrac{3-6\sin^2 x}{\frac{\sin x}{\cos x}+\frac{\cos x}{\sin x}}=\dfrac{3(1-2\sin^2 x)}{\frac{\sin^2 x+\cos^2 x}{\sin x\cdot\cos x}}=\dfrac{3\cos 2x}{\frac{1}{\frac{1}{2}\cdot\sin 2x}}$

$$\frac{3}{2}\sin 2x\cdot\cos 2x=\frac{3}{8}$$

$$\sin 2x\cdot\cos 2x=\frac{1}{4}$$

$$2\cdot\sin 2x\cdot\cos 2x=\frac{1}{2}$$

$$\sin 4x=\frac{1}{4} \Rightarrow 4x=\frac{\pi}{6}$$

$$x=\frac{\pi}{24}$$

Yanıt / Answer A

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13. $\dfrac{\sin 4x+2\sin 2x}{4\cos^3 x}$

$$=\frac{2\sin 2x\cdot\cos 2x+2\sin 2x}{4\cos^3 x}$$

$$=\frac{2\sin 2x\ (\cos 2x+1)}{4\cos^3 x}\quad\left[\begin{array}{l}\cos 2x=2\cos^2 x-1\\ \sin 2x=2\sin x\cdot\cos x\end{array}\right]$$

$$=\frac{8\sin x\cdot\cos x\cdot\cos^2 x}{4\cos^3 x}$$

$$2\sin x=\frac{4}{5} \Rightarrow \sin x=\frac{2}{5}$$

Yanıt / Answer B

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14. $\dfrac{\cos 2x}{\sin 2x}=2\cos 2x \Rightarrow \sin 2x=\dfrac{1}{2} \Rightarrow 2x=\dfrac{\pi}{6}$

$$\tan^2 x-\cot^2 x=\underset{(\sin^2 x)}{\frac{\sin^2 x}{\cos^2 x}}-\underset{(\cos^2 x)}{\frac{\cos^2 x}{\sin^2 x}}$$

$$=\frac{\sin^4 x-\cos^4 x}{\cos^2 x\cdot\sin^2 x}=\frac{-(\cos^4 x-\sin^2 x)}{\cos^2 x\cdot\sin^2 x}$$

$$=\frac{-\cos^2 2x}{\frac{1}{4}\cdot 4\cos^2 x\cdot\sin^2 x}=\frac{-(\cos^2 x-\sin^2 x)\cdot(\cos^2 x+\sin^2 x)}{\cos^2 x\cdot\sin^2 x}$$

$$=-4[\cot 2x]^2=-4\left[\cot\frac{\pi}{6}\right]^2=-4\left[\sqrt{3}\right]^2=-4\cdot 3=-12$$

Yanıt / Answer E

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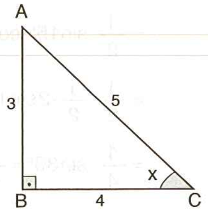
15. $\sin x=\frac{6}{10}=\frac{3}{5}$

$$\sin 2x=2\cdot\sin x\cdot\cos x$$

$$=2\cdot\frac{3}{5}\cdot\frac{4}{5}=\frac{24}{25}$$



Yanıt / Answer E

L

1. **sin 47° + sin 43° = ?**

A) $\sqrt{2}\cos 2°$ B) $\cos 4°$ C) $\sin 4°$

D) $\sqrt{2}\sin 2°$ E) $\sqrt{2}\cos 4°$

2. **cos 50° + cos 70° = ?**

A) $\sqrt{3}\sin 10°$ B) $-\sqrt{3}\sin 10°$ C) $\cos 10°$

D) $-\cos 10°$ E) $3\cos 10°$

3. **cos 40° – cos 80° = ?**

A) $-\sqrt{3}\sin 20°$ B) $-\sqrt{3}\cos 20°$

C) $\sin 20°$ D) $\sqrt{3}\cos 20°$

E) $\sqrt{3}\sin 20°$

4. $\dfrac{\sin 2x+\sin 4x}{\cos 2x+\cos 4x}=?$

A) $-\tan 3x$ B) $-\tan 2x$ C) $\tan 2x$

D) $\tan 3x$ E) $\tan 4x$

5. $A=\dfrac{\cos 20°+\sin 20°}{\sin 70°-\cos 70°} \Rightarrow A=?$

A) $-\tan 25°$ B) $-\cot 25°$ C) $\tan 25°$

D) $\cot 25°$ E) 1

6. $\sin 285° \cdot \sin 195° = A \Rightarrow A = ?$

A) $-\dfrac{1}{2}$ B) $-\dfrac{1}{4}$ C) $\dfrac{1}{2}$ D) $\dfrac{1}{3}$ E) $\dfrac{1}{4}$

7. **sin 50°· cos 70° = ?**

A) $\dfrac{\sqrt{3}}{4}-\dfrac{1}{2}\sin 20°$ B) $\dfrac{\sqrt{3}}{4}+\dfrac{1}{2}\sin 20°$

C) $-\dfrac{1}{4}\cos 20°$ D) $-\dfrac{1}{2}\sin 20°$

E) $\dfrac{1}{4}\sin 20°$

8. $\dfrac{\sin 70°-\sin 20°}{\cos 65°}=?$

A) $-\sqrt{3}$ B) $-\sqrt{2}$ C) $\sqrt{2}$ D) $\sqrt{3}$ E) 1

9. $\dfrac{\sin 40° - \cos 10°}{\cos 40° + \sin 10°} + \tan 20° = ?$

A) 0 B) 2 C) tan 10°

D) 2tan 20° E) –2tan 20°

10. cos 15°· sin 75° = ?

A) $-\dfrac{\sqrt{3}+2}{4}$ B) $\dfrac{-\sqrt{3}+2}{4}$ C) $\dfrac{\sqrt{3}-2}{4}$

D) $\dfrac{\sqrt{3}+2}{4}$ E) $\dfrac{\sqrt{3}+2}{2}$

11. $\dfrac{\sin 75° + \sin 15°}{\sin 75° - \sin 15°} = ?$

A) $-\sqrt{3}$ B) $-\dfrac{\sqrt{3}}{3}$ C) $\dfrac{\sqrt{3}}{3}$ D) $\dfrac{\sqrt{3}}{2}$ E) $\sqrt{3}$

12. $\cos 115° \cdot \sin 20° + \dfrac{1}{2}\cos 5° = ?$

A) $-\dfrac{\sqrt{2}}{4}$ B) $-\dfrac{\sqrt{2}}{2}$ C) $\dfrac{\sqrt{2}}{4}$ D) $\dfrac{\sqrt{2}}{2}$ E) $\dfrac{\sqrt{3}}{2}$

13. cos 20° · cos 40° · cos 60° · cos 80° = ?

A) $-\dfrac{1}{16}$ B) $-\dfrac{3}{16}$ C) $\dfrac{1}{16}$ D) $\dfrac{3}{16}$ E) $\dfrac{3}{8}$

14. $\dfrac{\cos 4x + \cos 6x}{\cos 4x - \cos 6x} = A \ , \ x = \dfrac{\pi}{2} \Rightarrow A = ?$

A) 0 B) $\dfrac{-\sqrt{2}}{2}$ C) $\dfrac{-\sqrt{2}}{3}$ D) 1 E) $\dfrac{\sqrt{2}}{2}$

15. $\dfrac{8 \sin 25° \cdot \cos 25°}{\cos 140°} = ?$

A) -1 B) $-\dfrac{1}{2}$ C) $-\dfrac{1}{3}$ D) -2 E) -4

16. $\cos\left(\arctan \dfrac{1}{\sqrt{3}}\right) = ?$

A) $\dfrac{\sqrt{3}}{2}$ B) $\dfrac{1}{2}$ C) $\sqrt{3}$

D) 1 E) 0

[EGE ÜNV. YÖS 2012]

Yanıtlar / Answers

1. A	4. D	7. B	10. D	13. C	16. A
2. C	5. D	8. C	11. E	14. A	
3. E	6. E	9. A	12. C	15. E	

1.

$$\sin 47^\circ+\sin 43^\circ=2\sin\frac{47^\circ+43^\circ}{2}\cdot\cos\frac{47^\circ-43^\circ}{2}$$

$$=2\sin\frac{90^\circ}{2}\cdot\cos\frac{4^\circ}{2}$$

$$=2\sin 45^\circ\cdot\cos 2^\circ$$

$$=2\frac{\sqrt{2}}{2}\cdot\cos 2^\circ=\sqrt{2}\,\cos 2^\circ$$

Yanıt / Answer A

2.

$$A=\cos 50^\circ+\cos 70^\circ$$

$$=2\cos\frac{70^\circ+50^\circ}{2}\cdot\cos\frac{70^\circ-50^\circ}{2}$$

$$=\ 2\cos 60^\circ\cdot\cos 10^\circ$$

$$=\ 2\cdot\frac{1}{2}\ \cos 10^\circ$$

$$=\cos 10^\circ$$

Yanıt / Answer C

3.

$$A=\cos 40^\circ-\cos 80^\circ$$

$$=-2\sin\frac{40^\circ+80^\circ}{2}\cdot\sin\frac{40^\circ-80^\circ}{2}$$

$$=-2\sin 60^\circ\cdot\sin\frac{-40^\circ}{2}$$

$$=2\cdot\frac{\sqrt{3}}{2}\cdot\sin 20^\circ$$

$$=\sqrt{3}\cdot\sin 20^\circ$$

Yanıt / Answer E

4.

$$A=\frac{\sin 2x+\sin 4x}{\cos 2x+\cos 4x}$$

$$=\frac{2\sin\frac{2x+4x}{2}\cdot\cos\frac{2x-4x}{2}}{2\cos\frac{2x+4x}{2}\cdot\cos\frac{2x-4x}{2}}$$

$$=\frac{2\sin 3x\cdot\cos x}{2\cos 3x\cdot\cos x}=\tan 3x$$

Yanıt / Answer D

5.

$$A=\frac{\cos 20^\circ+\sin 20^\circ}{\sin 70^\circ-\cos 70^\circ}\quad\left[\begin{array}{l}\cos 20^\circ=\sin 70^\circ\\ \\ \cos 70^\circ=\sin 20^\circ\end{array}\right]$$

$$=\frac{\sin 70^\circ+\sin 20^\circ}{\sin 70^\circ-\sin 20^\circ}$$

$$=\frac{2\sin\frac{70^\circ+20^\circ}{2}\cdot\cos\frac{70^\circ-20^\circ}{2}}{2\cos\frac{70^\circ+20^\circ}{2}\cdot\sin\frac{70^\circ-20^\circ}{2}}$$

$$=\frac{2\sin 45^\circ\cdot\cos 25^\circ}{2\cos 45^\circ\cdot\sin 25^\circ}=\cot 25^\circ$$

Yanıt / Answer D

6.

$$A=\sin 285^\circ\cdot\sin 195^\circ$$

$$=-\frac{1}{2}[\cos(285^\circ+195^\circ)-\cos(285^\circ-195^\circ)]$$

$$=-\frac{1}{2}[\cos 480^\circ-\cos 90^\circ]$$

$$=-\frac{1}{2}[\cos 120^\circ-0]$$

$$=-\frac{1}{2}[-\cos 60^\circ]=-\frac{1}{2}\left(-\frac{1}{2}\right)=\frac{1}{4}$$

Yanıt / Answer E

7.

$$A=\sin 50^\circ\cdot\cos 70^\circ$$

$$=\frac{1}{2}[\sin(50^\circ+70^\circ)-\sin(50^\circ-70^\circ)]$$

$$=\frac{1}{2}[\sin 120^\circ-\sin(-20^\circ)]$$

$$=\frac{1}{2}[\sin 60^\circ+\sin 20^\circ]$$

$$=\frac{1}{2}\left[\frac{\sqrt{3}}{2}+\sin 20^\circ\right]$$

$$=\frac{\sqrt{3}}{4}+\frac{1}{2}\ \sin 20^\circ$$

Yanıt / Answer B

8.

$$A=\frac{\sin 70^\circ-\sin 20^\circ}{\cos 65^\circ}$$

$$=\frac{2\cos\frac{70^\circ+20^\circ}{2}\cdot\sin\frac{70^\circ-20^\circ}{2}}{\cos 65^\circ}$$

$$=\frac{2\cos 45^\circ\cdot\sin 25^\circ}{\cos 65^\circ}\quad,\ (\sin 25^\circ=\cos 65^\circ)$$

$$=2\cos 45^\circ=2\cdot\frac{\sqrt{2}}{2}=\sqrt{2}$$

Yanıt / Answer C

9. $$A=\frac{\sin 40°-\cos 10°}{\cos 40°+\sin 10°}+\tan 20°$$

$$=\frac{\cos 50°-\cos 10°}{\sin 50°+\sin 10°}+\tan 20°$$

$$=\frac{-2\sin\frac{60°}{2}\cdot\sin\frac{40°}{2}}{2\sin\frac{60°}{2}\cdot\cos\frac{40°}{2}}+\tan 20°$$

$$=-\tan 20°+\tan 20°=0$$

Yanıt / Answer A

10. $$\cos 15°\cdot\sin 75°=\frac{1}{2}[\sin(75°+15°)+\sin(75°-15°)]$$

$$=\frac{1}{2}[\sin 90°+\sin 60°]$$

$$=\frac{1}{2}\left[1+\frac{\sqrt{3}}{2}\right]=\frac{\sqrt{3}+2}{4}$$

Yanıt / Answer D

11. $$A=\frac{\sin 75°+\sin 15°}{\sin 75°-\sin 15°}$$

$$=\frac{2\sin\frac{75°+15°}{2}\cdot\cos\frac{75°-15°}{2}}{2\cos\frac{75°+15°}{2}\cdot\sin\frac{75°-15°}{2}}$$

$$=\frac{2\sin 45°\cdot\cos 30°}{2\cos 45°\cdot\sin 30°}\quad,\ (\sin 45°=\cos 45°)$$

$$=\frac{\cos 30°}{\sin 30°}$$

$$=\cot 30°=\sqrt{3}$$

Yanıt / Answer E

12. $$\cos 115°\cdot\sin 20°+\frac{1}{2}\cos 5°$$

$$=\frac{1}{2}[\sin(115°+20°)+\sin(20°-115°)]+\frac{1}{2}\cos 5°$$

$$=\frac{1}{2}[\sin 135°-\sin 95°]+\frac{1}{2}\cos 5°$$

$$=\frac{1}{2}\left[\frac{\sqrt{2}}{2}-\cos 5°\right]+\frac{1}{2}\cos 5°$$

$$=\frac{\sqrt{2}}{4}-\frac{1}{2}\cos 5°+\frac{1}{2}\cos 5°$$

$$=\frac{\sqrt{2}}{4}$$

Yanıt / Answer C

13. $$\cos 20°\cdot\cos 40°\cdot\cos 60°\cdot\cos 80°$$

$$=\frac{2\cdot\sin 20°\cdot\cos 20°\cdot\cos 40°\cdot\cos 60°\cdot\cos 80°}{2\cdot\sin 20°}$$

$$=\frac{\sin 40°\cdot\cos 40°\cdot\cos 60°\cdot\cos 80°}{2\cdot\sin 20°}$$

$$=\frac{\sin 80°\cdot\cos 60°\cdot\cos 80°}{4\cdot\sin 20°}$$

$$=\frac{1}{2}\cdot\frac{\sin 160°}{8\sin 20°}=\frac{1}{16}$$

Yanıt / Answer C

14. $$A=\frac{\cos 4x+\cos 6x}{\cos 4x-\cos 6x}$$

$$=\frac{2\cos 5x\cdot\cos x}{2\sin 5x\cdot\sin x}$$

$$=\frac{2\cos\frac{5\pi}{2}\cdot\cos\frac{\pi}{2}}{2\sin\frac{5\pi}{2}\cdot\sin\frac{\pi}{2}}=0\quad,\ \left(\cos\frac{\pi}{2}=0\right)$$

Yanıt / Answer A

15. $$\frac{8\sin 25°\cdot\cos 25°}{\cos 140°}=\frac{4\cdot 2\cdot\sin 25°\cdot\cos 25°}{\cos 140°}$$

$$=\frac{4\cdot\sin 50°}{\cos(90°+50°)}$$

$$=\frac{4\cdot\sin 50°}{-\sin 50°}$$

$$=-4$$

Yanıt / Answer E

16. $$\arctan\frac{1}{\sqrt{3}}=\alpha\ \Rightarrow\ \alpha=30°$$

$$\cos\left(\arctan\frac{1}{\sqrt{3}}\right)=\cos 30°=\frac{\sqrt{3}}{2}$$

Yanıt / Answer A

By yos lovers

L

1. $\arcsin\left(\frac{\sqrt{3}}{2}\right) = x, \quad 0 \le x \le \frac{\pi}{2} \Rightarrow$ **x = ?**

A) 0 B) $\frac{\pi}{6}$ C) $\frac{\pi}{4}$ D) $\frac{\pi}{3}$ E) $\frac{\pi}{2}$

2. $\arccos\left(-\frac{1}{2}\right) = x, \quad 0 \le x \le \pi \Rightarrow$ **x = ?**

A) $\frac{\pi}{3}$ B) $\frac{\pi}{6}$ C) $\frac{\pi}{2}$ D) $\frac{2\pi}{3}$ E) $\frac{\pi}{6}$

3. $\arctan(-1) = x, \quad 0 < x < \pi \Rightarrow$ **x = ?**

A) $\frac{\pi}{4}$ B) $\frac{\pi}{2}$ C) $\frac{3\pi}{4}$ D) $\frac{3\pi}{8}$ E) $\frac{5\pi}{8}$

4. $-\frac{\pi}{2} \le x \le \frac{\pi}{2} \Rightarrow$ **$\cos\left(\arcsin\frac{3}{5}\right) = ?$**

A) $\frac{4}{5}$ B) $\frac{3}{5}$ C) $\frac{3}{4}$ D) $\frac{4}{3}$ E) $\frac{3}{8}$

5. $\frac{3\pi}{2} \le x \le 2\pi \Rightarrow$ **$\tan\left[\arcsin\left(-\frac{3}{4}\right)\right] = ?$**

A) $-\frac{3}{5}$ B) $-\frac{3}{\sqrt{7}}$ C) $\frac{3}{5}$ D) $\frac{3}{\sqrt{7}}$ E) $\frac{4}{5}$

6. $\arctan\left(\frac{5}{12}\right) = x \Rightarrow$ **$\sin x = ?$**

A) $\frac{5}{13}$ B) $\frac{5}{12}$ C) $\frac{8}{17}$ D) $\frac{5}{17}$ E) $\frac{13}{7}$

7. **$\cot\left(\arctan\frac{3}{4} - \arctan\frac{1}{2}\right) = ?$**

A) $\frac{13}{5\sqrt{5}}$ B) $\frac{11}{5\sqrt{5}}$ C) $\frac{9}{\sqrt{5}}$

D) $\frac{11}{2}$ E) $-\frac{11}{2}$

8. **$\tan\left(\operatorname{arccot}\frac{2}{3}\right) = ?$**

A) $\frac{2}{3}$ B) $\frac{3}{2}$ C) $\frac{1}{3}$ D) 3 E) 2

9. $\sin(\arctan 2) = ?$

A) $\frac{1}{2}$ B) $\frac{2}{3}$ C) $\frac{3}{\sqrt{3}}$ D) $\frac{2}{\sqrt{5}}$ E) $\frac{1}{\sqrt{5}}$

10. $\tan(\arccos x) = ?$

A) $\frac{\sqrt{1-x^2}}{x}$ B) $\frac{\sqrt{1+x^2}}{x}$ C) $\frac{\sqrt{x^2-1}}{x}$

D) $\frac{\sqrt{x^2+1}}{x}$ E) $\frac{\sqrt{x^2-1}}{x}$

11. $\sin(\arccos 1) = ?$

A) 4 B) 3 C) 2

D) 1 E) 0

12. $\cos\left(\frac{\pi}{2} + \arcsin\frac{8}{15}\right) = ?$

A) $-\frac{4}{15}$ B) $-\frac{8}{15}$ C) 0 D) $\frac{4}{18}$ E) $\frac{8}{15}$

13. $x \in Z$,

$f(x) = \arcsin\left(\frac{x-1}{3}\right) \Rightarrow \sum x = ?$

A) 4 B) 5 C) 6

D) 7 E) 8

14. $f(x) = \arcsin\left(\frac{3-x}{2}\right) \Rightarrow$ **Tanım kümesi / domain = ?**

A) $1 \le x \le 5$

B) $2 \le x \le 5$

C) $3 \le x \le 5$

D) $3 \le x \le 7$

E) $2 \le x \le 7$

15. $\text{arccot}\,5° = x \Rightarrow$ **$\sin x \cdot \cos x - \tan x = ?$**

A) $-\frac{1}{100}$ B) $-\frac{1}{110}$ C) $-\frac{1}{120}$

D) $-\frac{1}{125}$ E) $-\frac{1}{130}$

Yanıtlar / Answers

1. D	4. A	7. D	10. A	13. D
2. D	5. B	8. B	11. E	14. A
3. C	6. A	9. D	12. B	15. E

1. $\arcsin\left(\dfrac{\sqrt{3}}{2}\right)=x \Rightarrow \sin x=\dfrac{\sqrt{3}}{2}$

$x\in\left(0,\dfrac{\pi}{2}\right)\Rightarrow x=\dfrac{\pi}{3}$

Yanıt / Answer D

2. $\arccos\left(-\dfrac{1}{2}\right)=x \Rightarrow \cos x=\dfrac{-1}{2}$

$x\in\left(0,\dfrac{\pi}{2}\right)\Rightarrow x=\pi-\dfrac{\pi}{3}=\dfrac{2\pi}{3}$

Yanıt / Answer D

3. $\arctan(-1)=x \Rightarrow \tan x=-1$

$x\in(0,\pi) \Rightarrow x=\pi-\dfrac{\pi}{4}=\dfrac{3\pi}{4}$

Yanıt / Answer C

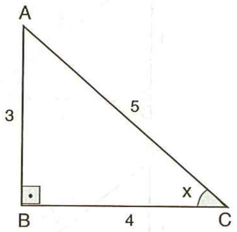
4. $\arcsin\dfrac{3}{5}=x$

$\sin x=\dfrac{3}{5}=\dfrac{|AB|}{|AC|}$

$|BC|^2+3^2=5^2$

$|BC|^2=16$

$|BC|=4$



$\cos\left(\arcsin\dfrac{3}{5}\right)=\cos x=\dfrac{|BC|}{|AC|}=\dfrac{4}{5}$

Yanıt / Answer A

5. $\arcsin\left(-\dfrac{3}{4}\right)=x$

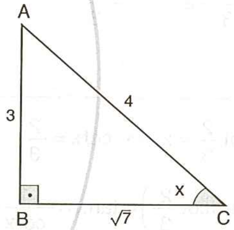
$\sin x=-\dfrac{3}{4}=\dfrac{|AB|}{|AC|}$

$|AB|^2+|BC|^2=|AC|^2$

$3^2+|BC|^2=4^2$

$|BC|^2=7$

$BC=\sqrt{7}$



$\tan x=-\dfrac{3}{\sqrt{7}}$

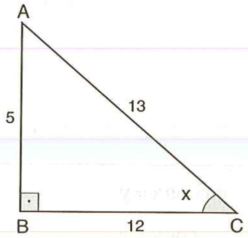
Yanıt / Answer B

6. $\arctan\left(\dfrac{5}{12}\right)=x$

$\tan x=\dfrac{5}{12}$

$|AC|^2=5^2+12^2$

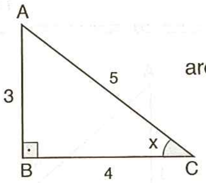
$|AC|=13$



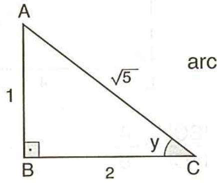
$\sin x=\dfrac{5}{13}$

Yanıt / Answer A

7.



$$\arctan\frac{3}{4}=x \Rightarrow \tan x=\frac{3}{4}$$



$$\arctan\frac{1}{2}=y \Rightarrow \tan y=\frac{1}{2}$$

$$\Rightarrow \cot\left(\arctan\frac{3}{4}-\arctan\frac{1}{2}\right)$$

$$\Rightarrow \cot(x-y)=\frac{\cot x\cdot\cot y+1}{\cot x-\cot y}$$

$$=\frac{\frac{4}{3}\cdot\frac{2}{1}+1}{\frac{4}{3}-2}=\frac{\frac{11}{3}}{-\frac{2}{3}} \Rightarrow -\frac{11}{2}$$

Yanıt / Answer E

8. $\operatorname{arccot}\frac{2}{3}=x \Rightarrow \cot x=\frac{2}{3}$

$$\tan\left(\operatorname{arccot}\frac{2}{3}\right)=\tan x=\frac{1}{\cot x}=\frac{1}{\frac{2}{3}}=\frac{3}{2}$$

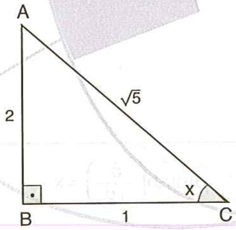
Yanıt / Answer B

9. $\arctan 2=x$

$\Rightarrow \tan x=2$

$\sin x=\frac{2}{\sqrt{5}} \Rightarrow$

$\sin(\arctan 2)=\frac{2}{\sqrt{5}}$



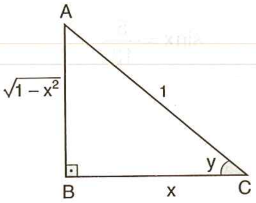
Yanıt / Answer D

10. $\arccos x=y$

$\cos y=x$

$\tan(\arccos x)=\tan y$

$=\frac{\sqrt{1-x^2}}{x}$



Yanıt / Answer A

11. $x=\arccos 1$

$\cos x=1$

$x=0 \Rightarrow \sin(\arccos 1)=\sin x=0$

Yanıt / Answer E

12. $x=\arcsin\frac{8}{15} \Rightarrow \sin x=\frac{8}{15}$

$$\cos\left(\frac{\pi}{2}+\arcsin\frac{8}{15}\right)=\cos\left(\frac{\pi}{2}+x\right)$$

$$=-\sin x=-\frac{8}{15}$$

Yanıt / Answer B

13. $-1\le\frac{x-1}{3}\le 1$

$-3\le x-1\le 3$

$-2\le x\le 4$

$\sum x=-2-1+0+1+2+3+4=7$

Yanıt / Answer D

14. $-1\le\frac{3-x}{2}\le 1$

$-2\le 3-x\le 2$

$-5\le -x\le -1$

$1\le x\le 5$

Yanıt / Answer A

15. $x=\operatorname{arccot}5 \Rightarrow \cot x=5$

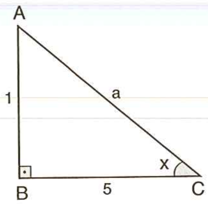
$a^2=5^2+1^2$

$a=\sqrt{26}$

$\sin x\cdot\cos x-\tan x$

$=\frac{1}{\sqrt{26}}\cdot\frac{5}{\sqrt{26}}-\frac{1}{5}$

$=\frac{5}{26}-\frac{1}{5}=-\frac{1}{30}$



Yanıt / Answer E

1. $\sin x = \frac{1}{2} \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{x \in R,\ x = \frac{\pi}{6} + 2k\pi \ \vee\ x = \frac{5\pi}{6} + 2k\pi\right\}$

B) $\left\{x \in R,\ x = \frac{\pi}{6} + 2k\pi \ \vee\ x = \frac{\pi}{6} + 2k\pi\right\}$

C) $\left\{x \in R,\ x = \frac{\pi}{12} + 2k\pi \ \vee\ x = \frac{5\pi}{12} + 2k\pi\right\}$

D) $\left\{x \in R,\ x = \frac{\pi}{12} + 2k\pi \ \vee\ x = \frac{5\pi}{6} + 2k\pi\right\}$

E) $\left\{x \in R,\ x = \frac{\pi}{12} + 2k\pi \ \vee\ x = \frac{7\pi}{12} + 2k\pi\right\}$

2. $\sin 4x = \frac{\sqrt{3}}{2},\ 0 < x \le \frac{\pi}{2} \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{\frac{\pi}{6}, \frac{\pi}{3}\right\}$ B) $\left\{\frac{\pi}{6}, \frac{\pi}{2}\right\}$ C) $\left\{\frac{\pi}{12}, \frac{\pi}{3}\right\}$

D) $\left\{\frac{\pi}{12}, \frac{\pi}{6}\right\}$ E) $\left\{\frac{\pi}{12}, \frac{\pi}{2}\right\}$

3. $\cos 3x = \frac{\sqrt{3}}{2},\ 0 \le x \le \pi \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{\frac{\pi}{8}\right\}$ B) $\left\{\frac{\pi}{18}, \frac{\pi}{12}\right\}$ C) $\left\{\frac{\pi}{18}, \frac{13\pi}{18}\right\}$

D) $\left\{\frac{\pi}{18}, \frac{15\pi}{18}\right\}$ E) $\left\{\frac{\pi}{18}, \frac{13\pi}{18}, \frac{11\pi}{18}\right\}$

4. $\tan x = \sqrt{3},\ 0 \le x \le 2\pi \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{\frac{\pi}{3}, \frac{2\pi}{3}\right\}$ B) $\left\{\frac{\pi}{3}, \frac{\pi}{6}\right\}$ C) $\left\{\frac{\pi}{3}, \pi\right\}$

D) $\left\{\frac{\pi}{3}, \frac{5\pi}{6}\right\}$ E) $\left\{\frac{\pi}{3}, \frac{4\pi}{3}\right\}$

5. $2\sin^2 x - \sin x - 1 = 0,\ 0 \le x \le 2\pi \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{\frac{\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}\right\}$ B) $\left\{\frac{7\pi}{6}, \frac{11\pi}{6}\right\}$

C) $\left\{\frac{\pi}{2}, \frac{11\pi}{6}\right\}$ D) $\left\{\frac{\pi}{2}, \frac{7\pi}{6}\right\}$

E) $\left\{\frac{\pi}{2}, \frac{5\pi}{6}, \frac{7\pi}{6}\right\}$

6. $\tan 2x = 1,\ 0 \le x \le \pi \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{\frac{\pi}{8}, \frac{\pi}{4}\right\}$ B) $\left\{\frac{\pi}{8}, \frac{5\pi}{8}\right\}$ C) $\left\{\frac{\pi}{8}, \frac{\pi}{2}\right\}$

C) $\left\{\frac{\pi}{8}, \frac{3\pi}{8}\right\}$ E) $\left\{\frac{\pi}{8}, \frac{3\pi}{4}\right\}$

7. $\cos^2x - 2\cos x - 3 = 0,\ 0 \le x \le 2\pi \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{\pi, \frac{3\pi}{2}\right\}$ B) $\left\{\frac{\pi}{2}, \pi\right\}$ C) $\left\{\pi, \frac{4\pi}{3}\right\}$

D) $\left\{\frac{\pi}{3}, \frac{\pi}{6}, \pi\right\}$ E) $\{\pi\}$

8. $\cos x = 0,\ 0 \le x \le 2\pi \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{\frac{\pi}{2}\right\}$ B) $\left\{\frac{\pi}{4}\right\}$ C) $\left\{\frac{\pi}{2}, \frac{\pi}{4}\right\}$

D) $\left\{\frac{\pi}{4}, \frac{3\pi}{2}\right\}$ E) $\left\{\frac{\pi}{2}, \frac{3\pi}{2}\right\}$

9. $\sin 3x = \cos 2x,\ 0 \le x \le \pi \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{\frac{\pi}{10}, \frac{\pi}{2}\right\}$ B) $\left\{\frac{\pi}{10}, \frac{\pi}{5}\right\}$ C) $\left\{\frac{\pi}{10}, \frac{\pi}{2}, \frac{\pi}{5}\right\}$

D) $\left\{\frac{\pi}{10}, \frac{\pi}{2}, \frac{3\pi}{10}\right\}$ E) $\left\{\frac{\pi}{10}, \frac{9\pi}{10}\right\}$

10. $\pi < x < \frac{3\pi}{2}$

$\sin^2 x - \sin x - \frac{3}{4} = 0$

$\Rightarrow$ **x = ?**

A) $\frac{2\pi}{3}$ B) $\frac{5\pi}{6}$ C) π D) $\frac{7\pi}{6}$ E) $\frac{4\pi}{3}$

11. $0 < x < \pi$,

$4\cos^2x - 3 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{\frac{\pi}{3}, \frac{2\pi}{3}\right\}$ B) $\left\{\frac{\pi}{3}, \frac{\pi}{2}\right\}$ C) $\left\{\frac{\pi}{3}, \frac{3\pi}{2}\right\}$

D) $\left\{\frac{\pi}{2}, \pi\right\}$ E) $\left\{\frac{\pi}{6}, \frac{5\pi}{6}\right\}$

12. $\pi < x < \frac{3\pi}{2}$,

$\cos 2x - \sin x - 1 = 0 \Rightarrow$ **x = ?**

A) $\frac{\pi}{2}$ B) $\frac{2\pi}{3}$ C) $\frac{5\pi}{6}$ D) π E) $\frac{7\pi}{6}$

13. $\frac{3\pi}{2} < x < 2\pi$,

$\sin x = \cos(\frac{\pi}{3} - 2x) \Rightarrow$ **x = ?**

A) $\frac{11\pi}{6}$ B) $\frac{9\pi}{5}$ C) $\frac{2\pi}{3}$ D) $\frac{\pi}{3}$ E) $\frac{\pi}{6}$

Yanıtlar / Answers

1. A	**4. E**	**7. E**	**10. D**	**13. A**
2. D	**5. A**	**8. E**	**11. A**	
3. E	**6. B**	**9. D**	**12. E**	

1. $\sin x = \frac{1}{2} \Rightarrow$

$$x_1 = \frac{\pi}{6} + 2k\pi \vee x_2 = \left(\pi - \frac{\pi}{6}\right) + 2k\pi$$

$$x_1 = \frac{\pi}{6} + 2k\pi \vee x_2 = \frac{5\pi}{6} + 2k\pi$$

$$ÇK(SS) = \left\{x \in R : \frac{\pi}{6} + 2k\pi \vee x = \frac{5\pi}{6} + 2k\pi\right\}$$

Yanıt / Answer A

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2. $\sin 4x = \frac{\sqrt{3}}{2} \Rightarrow$

$$4x_1 = \frac{\pi}{3} + 2k\pi \vee 4x_2 = \left(\pi - \frac{\pi}{3}\right) + 2k\pi$$

$$\Rightarrow \begin{cases} x_1 = \frac{\pi}{12} + \frac{k\pi}{2} \vee x_2 = \frac{\pi}{6} + \frac{k\pi}{2} \\ k = 0 \Rightarrow x_1 = \frac{\pi}{12} \vee x_2 = \frac{\pi}{6} \end{cases}$$

$$ÇK(SS) = \left\{\frac{\pi}{12}, \frac{\pi}{6}\right\}$$

Yanıt / Answer D

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3. $\cos 3x = \frac{\sqrt{3}}{2} \Rightarrow$

$$3x_1 = \frac{\pi}{6} + 2k\pi \vee 3x_2 = -\frac{\pi}{6} + 2k\pi$$

$$x_1 = \frac{2k\pi}{3} + \frac{\pi}{18} \vee x_2 = \frac{2k\pi}{3} - \frac{\pi}{18}$$

$$\Rightarrow \begin{cases} k = 0 \Rightarrow x_1 = \frac{\pi}{18} \vee x_2 = \frac{-\pi}{18} \\ k = 1 \Rightarrow \begin{cases} x_1 = \frac{2\pi}{3} + \frac{\pi}{18} \vee x_2 = \frac{2\pi}{3} - \frac{\pi}{18} \\ x_1 = \frac{13\pi}{18} \vee x_2 = \frac{11\pi}{18} \end{cases} \end{cases}$$

$$ÇK(SS) = \left\{\frac{\pi}{18}, \frac{11\pi}{18}, \frac{13\pi}{18}\right\}$$

Yanıt / Answer E

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4. $\tan x = \sqrt{3} \Rightarrow x = k\pi + \frac{\pi}{3}$

$$\Rightarrow \begin{cases} k = 0 \Rightarrow x_1 = \frac{\pi}{3} \\ k = 1 \Rightarrow x_2 = \pi + \frac{\pi}{3} = \frac{4\pi}{3} \\ k = 2 \Rightarrow x_3 \neq 2\pi + \frac{\pi}{3} \quad (0 \leq x \leq 2\pi) \end{cases}$$

$$ÇK(SS) = \left\{\frac{\pi}{3}, \frac{4\pi}{3}\right\}$$

Yanıt / Answer E

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5. $\sin x = t$

$$\sin x = 1 \Rightarrow x_1 = \frac{\pi}{2}$$

$$\sin x = -\frac{1}{2} \Rightarrow \sin x = \sin\left(\pi + \frac{\pi}{6}\right)$$

$$\sin x = \sin\frac{7\pi}{6}$$

$$\Rightarrow x_2 = \frac{7\pi}{6} \vee x_3 = \frac{11\pi}{6}$$

$$ÇK(SS) = \left\{\frac{\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}\right\}$$

Yanıt / Answer A

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6. $\left.\begin{matrix} \tan 2x = 1, \\ \tan 2x = \tan\frac{\pi}{4} \end{matrix}\right\} \Rightarrow 2x = k\pi + \frac{\pi}{4} \Rightarrow x = \frac{k\pi}{2} + \frac{\pi}{8}$

$$\Rightarrow \begin{cases} k = 0 \Rightarrow x_1 = \frac{\pi}{8} \\ k = 1 \Rightarrow x_2 = \frac{\pi}{2} + \frac{\pi}{8} = \frac{5\pi}{8} \\ k = 2 \Rightarrow x_3 = \frac{3\pi}{2} + \frac{\pi}{8} \neq \frac{13\pi}{8} \quad 0 \leq x \leq \pi \end{cases}$$

$$ÇK(SS) = \left\{\frac{\pi}{8}, \frac{5\pi}{8}\right\}$$

Yanıt / Answer B

7.

$$\left.\begin{array}{l}\cos^2 x-2\cos x-3=0\\ \cos x=t\end{array}\right\}\Rightarrow t^2-2t-3=0$$

$$(t-3)\cdot(t+1)=0 \Rightarrow t_1=3 \vee t_2=-1$$

$$\Rightarrow \begin{cases}\cos x=-1 \Rightarrow x=\pi\\ \cos x\neq 3\end{cases}$$

$$\text{ÇK(SS)}=\{\pi\}$$

Yanıt / Answer E

8.

$$\left.\begin{array}{l}\cos x=0\\ \cos x=\cos\dfrac{\pi}{2}\end{array}\right\}$$

$$\Rightarrow x_1=2k\pi+\frac{\pi}{2} \vee x_2=2k\pi-\frac{\pi}{2}$$

$$\Rightarrow \begin{cases}k=0 \Rightarrow x_1=\dfrac{\pi}{2} \vee x_2\neq-\dfrac{\pi}{2}\\ k=1 \Rightarrow x_1\neq 2\pi+\dfrac{\pi}{2} \vee x_2=2\pi-\dfrac{\pi}{2}=\dfrac{3\pi}{2}\end{cases}$$

$$\text{ÇK(SS)}=\left\{\frac{\pi}{2},\ \frac{3\pi}{2}\right\}$$

Yanıt / Answer E

9.

$$\cos 2x=\sin 3x$$

$$\cos 2x=\cos\left(\frac{\pi}{2}-3x\right)$$

$$2x=2k\pi\pm\frac{\pi}{2}-3x$$

$$5x=2k\pi\pm\frac{\pi}{2}$$

$$\Rightarrow x_1=\frac{2k\pi}{5}+\frac{\pi}{10} \vee x_2=\frac{2k\pi}{5}-\frac{\pi}{10}$$

$$\Rightarrow \begin{cases}k=0 \Rightarrow x_1=\dfrac{\pi}{10} \vee x_2\neq-\dfrac{\pi}{10}\\ k=1 \Rightarrow \begin{cases}x_1=\dfrac{2\pi}{5}+\dfrac{\pi}{10} \Rightarrow x_2=\dfrac{5\pi}{10}=\dfrac{\pi}{2}\\ x_2=\dfrac{5\pi}{10}-\dfrac{\pi}{2} \Rightarrow x_2=\dfrac{3\pi}{10}\end{cases}\end{cases}$$

$$\text{ÇK(SS)}=\left\{\frac{\pi}{10},\ \frac{\pi}{2},\ \frac{3\pi}{10}\right\}$$

Yanıt / Answer D

10.

$$4\sin^2 x-4\sin x-3=0$$

$$\Delta=16+48=64$$

$$\Rightarrow \sin x=\frac{4\pm 8}{4\cdot 2} \Rightarrow \begin{cases}\sin x\neq\dfrac{12}{8} \quad (-1\leq \sin x\leq 1)\\ \sin x=-\dfrac{1}{2}\end{cases}$$

$$\sin x=-\frac{1}{2}=\sin x=\sin\frac{7\pi}{6} \Rightarrow x=\frac{7\pi}{6}$$

Yanıt / Answer D

11.

$$4\cos^2 x-3=0 \Rightarrow 4\cos^2 x=3 \Rightarrow \cos^2 x=\frac{3}{4}$$

$$\Rightarrow \begin{cases}\cos x=\dfrac{\sqrt{3}}{2}\\ \cos x=-\dfrac{\sqrt{3}}{2}\end{cases}$$

$$\left.\begin{array}{l}\cos x=\dfrac{\sqrt{3}}{2} \Rightarrow x=\dfrac{\pi}{3}\\ \cos x=-\dfrac{\sqrt{3}}{2} \Rightarrow x=\dfrac{2\pi}{3}\end{array}\right\}\Rightarrow \text{ÇK(SS)}=\left\{\frac{\pi}{3},\ \frac{2\pi}{3}\right\}$$

Yanıt / Answer A

12.

$$\cos 2x-\sin x-1=0 \Rightarrow 1-2\sin^2 x-\sin x-1=0$$

$$2\sin^2 x+\sin x=0 \Rightarrow \sin x(2\sin x+1)=0$$

$$\sin x=0 \Rightarrow \begin{cases}x_1\neq 0 \quad \left(\pi<x<\dfrac{3\pi}{2}\right)\\ x_2\neq \pi \quad \left(\pi<x<\dfrac{3\pi}{2}\right)\end{cases}$$

$$2\sin x+1=0 \Rightarrow \sin x=-\frac{1}{2} \Rightarrow x=\frac{7\pi}{6}$$

$$\Rightarrow \sum x=\frac{7\pi}{6}$$

Yanıt / Answer E

13.

$$\sin x=\cos\left(\frac{\pi}{3}-2x\right)$$

$$\cos\left(\frac{\pi}{2}-x\right)=\cos\left(\frac{\pi}{3}-2x\right)$$

$$\frac{\pi}{2}-x=\frac{\pi}{3}-2x$$

$$-x+2x=\frac{\pi}{3}-\frac{\pi}{2} \Rightarrow x=\frac{-\pi}{6}$$

$$x=2\pi-\frac{\pi}{6}=\frac{11\pi}{6}$$

Yanıt / Answer A

KARMAŞIK SAYILAR
COMPLEX NUMBERS

BÖLÜM
CHAPTER
3

Karmaşık Sayılar / Complex Numbers

Test 1

1. $A=\sqrt{-3}\cdot\sqrt{12}+\sqrt{-2}\cdot\sqrt{-8}\Rightarrow$ **A = ?**

A) 6 – 4i B) 6 + 4i C) –6 – 4i D) 6i – 4 E) 6i + 4

2. $z=\sqrt{-6}\cdot\sqrt{-27}\cdot\sqrt{-2}\Rightarrow$ **z = ?**

A) –36i B) –24i C) –18i D) –18 E) –24

3. $x^2+4=0\Rightarrow$ **ÇK(SS) = ?**

A) {–4i} B) {4i} C) {–2i} D) {–2i, 2i} E) {–4i, 4i}

4. $x^2-4x+5=0\Rightarrow$ **ÇK(SS) = ?**

A) {1 ∓ i} B) {2 ∓ i} C) {4 ∓ i} D) {1 ∓ 2i} E) {2 ∓ 2i}

5. $i^{1955}+i^{1962}+i^{1980}=?$

A) –i B) –i – 2 C) 2 – i D) 1 – i E) i

6. $P(x)=x^{19}-x^{16}+3x^{11}-x^{7}+5\Rightarrow$ **P(i) = ?**

A) 3 – 2i B) 4 – 2i C) 4 – 3i D) 3 + 4i E) 3 – 4i

7. $i^{40}+i^{61}+i^{94}+i^{123}=?$

A) –2 B) –1 C) 0 D) i E) 2i

8. $(1+i)\cdot(1+i^{3})\cdot(1+i^{6})=?$

A) 3 B) 1 C) 0 D) –1 E) –3

9. $\frac{i^{50}+2\cdot i^{23}-i^{102}}{i^{101}}=?$

A) i B) -2 C) $-2i$ D) $3i$ E) $-i$

10. $3x + yi - 2 = 4 + (2y + 4x)i \Rightarrow$ **$x + y = ?$**

A) -8 B) -6 C) -4 D) 4 E) 6

11. $z = a + bi$

$(2 - i)z = i\cdot z + 4 \Rightarrow$ **$\mathrm{Re}(z) = ?$**

A) -3 B) -2 C) 1 D) 2 E) 4

12. $z = a + bi$

$z = \overline{z}\,(1 + i) + 3 - 8i \Rightarrow$ **$\mathrm{Re}(z) = ?$**

A) -2 B) -1 C) 0 D) 1 E) 2

13. $z_1 = x - 2y + 3i - xi,$

$z_2 = y + 5 + (x + y)\,i$

$z_1 = z_2 \Rightarrow$ **$x = ?$**

A) -4 B) -2 C) -1 D) 2 E) 3

14. $z = a + bi$

$(z - 1)\,(1 - i) = 1 + i \Rightarrow$ **$z = ?$**

A) $1 - i$ B) $1 + i$ C) $2 - i$

D) $2 + i$ E) $1 + 2i$

15. $a + bi = (2 - i)(1 + \sqrt{-4}) \Rightarrow$ **$a - b = ?$**

A) -3 B) -1 C) 1 D) 3 E) 7

16. $i^2 = -1$

$\Rightarrow$ **$i^{2012} - i^{2013} + i^{2014} - i^{2015} = ?$**

A) $-i$ B) i C) 0

D) 1 E) -1

[AKDENİZ ÜNV. YÖS 2013]

Yanıtlar / Answers

1. D	**4. B**	**7. C**	**10. B**	**13. D**	**16. C**
2. C	**5. A**	**8. C**	**11. C**	**14. B**	
3. D	**6. C**	**9. B**	**12. E**	**15. C**	

1. $$\left.\begin{array}{l}\sqrt{-3}=\sqrt{-1}\cdot\sqrt{3}=\sqrt{3}\,i\\ \sqrt{12}=\sqrt{4\cdot 3}=2\sqrt{3}\\ \sqrt{-2}=\sqrt{-1}\cdot\sqrt{2}=\sqrt{2}\,i\\ \sqrt{-8}=\sqrt{-1}\cdot\sqrt{8}=2\sqrt{2}\,i\end{array}\right\}\Rightarrow \begin{array}{l}A=\sqrt{3}\,i\cdot 2\sqrt{3}+\sqrt{2}\,i\cdot 2\sqrt{2}\,i\\ =6i+4i^2\\ =6i-4\end{array}$$

Yanıt / Answer D

2. $$\left.\begin{array}{l}\sqrt{-6}=\sqrt{-1}\cdot\sqrt{6}=\sqrt{6}\,i\\ \sqrt{-27}=\sqrt{-1}\cdot\sqrt{27}=3\sqrt{3}\,i\\ \sqrt{-2}=\sqrt{-1}\cdot\sqrt{2}=\sqrt{2}\,i\end{array}\right\}\Rightarrow \begin{array}{l}z=\sqrt{6}\,i\cdot 3\sqrt{3}\,i\cdot\sqrt{2}\,i\\ =18i^3=-18i\end{array}$$

Yanıt / Answer C

3. $x^2+4=0 \Rightarrow x^2=-4$

$x=\pm\sqrt{-4}$

$$\Rightarrow \begin{cases}x_1=2i\\ x_2=-2i\end{cases}$$

$ÇK(SS)=\{-2i,2i\}$

Yanıt / Answer D

4. $x^2-4x+5=0$

$\Delta=(-4)^2-4\cdot 5=16-20=-4$

$$x_{1,2}=\frac{4\pm\sqrt{-4}}{2}\Rightarrow\begin{cases}x_1=\dfrac{4+2i}{2}=2+i\\ x_2=\dfrac{4-2i}{2}=2-i\end{cases}$$

$ÇK(SS)=\{2\pm i\}$

Yanıt / Answer B

5. $$\begin{array}{r|l}1955 & 4\\ - \quad & 483\\ \hline 3 & \end{array}\qquad \begin{array}{r|l}1962 & 4\\ - \quad & 490\\ \hline 2 & \end{array}\qquad \begin{array}{r|l}1980 & 4\\ - \quad & 495\\ \hline 0 & \end{array}$$

$$\begin{aligned}i^{1955}+i^{1962}+i^{1980}&=i^3+i^2+i^0\\ &=-i-1+1\\ &=-i\end{aligned}$$

Yanıt / Answer A

6. $$\begin{array}{r|l}19 & 4\\ -16 & 4\\ \hline 3 & \end{array}\qquad \begin{array}{r|l}16 & 4\\ -16 & 4\\ \hline 0 & \end{array}\qquad \begin{array}{r|l}11 & 4\\ -8 & 2\\ \hline 3 & \end{array}\qquad \begin{array}{r|l}7 & 4\\ -4 & 1\\ \hline 3 & \end{array}$$

$$\begin{aligned}P(x)&=x^{19}-x^{16}+3x^{11}-x^7+5\\ P(i)&=i^{19}-i^{16}+3i^{11}-i^7+5\\ &=i^3-i^0+3i^3-i^3+5\\ &=-i-1-3i+i+5=4-3i\end{aligned}$$

Yanıt / Answer C

7. $$\begin{array}{r|l}40 & 4\\ -40 & 10\\ \hline 0 & \end{array}\qquad \begin{array}{r|l}61 & 4\\ -60 & 15\\ \hline 1 & \end{array}\qquad \begin{array}{r|l}94 & 4\\ -92 & 23\\ \hline 2 & \end{array}\qquad \begin{array}{r|l}123 & 4\\ -120 & 30\\ \hline 3 & \end{array}$$

$$\begin{aligned}i^{40}+i^{61}+i^{94}+i^{123}&=i^0+i^1+i^2+i^3\\ &=1+i-1-i\\ &=0\end{aligned}$$

Yanıt / Answer C

8. $$\begin{aligned}(1+i)\cdot(1+i^3)\cdot(1+i^6)&=(1+i)\cdot(1-i)\cdot(1+i^2)\\ &=(1-i^2)\cdot(1-1)\\ &=(1+1)\cdot 0\\ &=0\end{aligned}$$

Yanıt / Answer C

9. $\begin{array}{r|l} 50 & 4 \\ -48 & 12 \\ \hline 2 & \end{array}$ $\quad \begin{array}{r|l} 23 & 4 \\ -20 & 5 \\ \hline 3 & \end{array}$ $\quad \begin{array}{r|l} 102 & 4 \\ -100 & 25 \\ \hline 2 & \end{array}$ $\quad \begin{array}{r|l} 101 & 4 \\ -100 & 25 \\ \hline 1 & \end{array}$

$$\frac{i^{50}+2\cdot i^{23}-i^{102}}{i^{101}}=\frac{i^2+2i^3-i^2}{i}$$

$$=\frac{-1-2i+1}{i}$$

$$=\frac{-2i}{i}=-2$$

Yanıt / Answer B

10. $3x+yi-2=4+(2y+4x)i$

$$\Rightarrow \begin{cases} 3x-2=4 \Rightarrow 3x=6 \Rightarrow x=2 \\ y=2y+4x \Rightarrow -y=4\cdot 2 \Rightarrow y=-8 \end{cases}$$

$x+y=2-8=-6$

Yanıt / Answer B

11. $(2-i)\cdot z=iz+4$

$(2-i)(a+bi)=i(a+bi)+4$

$2a+2bi-ai-bi^2=ai+bi^2+4$

$(2a+b)+i(2b-a)=ai-b+4$

$(2a+b)+(2b-a)i=(4-b)+ai$

$2a+b=4-b$

$2a+2b=4 \Rightarrow a+b=2$

$2b-a=a$

$2b=2a \Rightarrow b=a$

$a+b=2$

$2a=2 \Rightarrow a=1$

$\mathrm{Re}(z)=1$

Yanıt / Answer C

12. $z=\overline{z}\,(1+i)+3-8i$

$a+bi=(a-bi)\cdot(1+i)+3-8i$

$a+bi=a+ai-bi+b+3-8i$

$a+bi=(a+b+3)+(a-b-8)i$

$$\Rightarrow \begin{cases} a=a+b+3 \Rightarrow b=-3 \\ b=a-b-8 \Rightarrow a=2 \end{cases}$$

$z=2-3i \Rightarrow \mathrm{Re}(z)=2$

Yanıt / Answer E

13. $z_1=z_2$

$(x-2y)+(3-x)i=(y+5)+(x+y)i$

$$\Rightarrow \begin{cases} x-2y=y+5 \Rightarrow x-3y=5 \\ 3-x=x+y \Rightarrow 2x+y=3 \end{cases}$$

$$\left.\begin{array}{r} x-3y=5 \\ 3\,/\;2x+y=3 \end{array}\right\} \Rightarrow \begin{array}{r} x-3y=5 \\ +\;6x+3y=9 \\ \hline \end{array}$$

$7x=14 \Rightarrow x=2$

Yanıt / Answer D

14. $(z-1)\,(1-i)=1+i \Rightarrow$

$z-1=\dfrac{1+i}{1-i} \Rightarrow z=\dfrac{1+i}{1-i}+1$

$z=\dfrac{1+i+1-i}{1-i}=\dfrac{2}{1-i}$

$z=\dfrac{2(1+i)}{1-i^2}=\dfrac{2(1+i)}{2}=1+i$

Yanıt / Answer B

15. $a+bi=(2-i)(1+\sqrt{-4})$

$a+bi=(2-i)\cdot(1+2i)=2+4i-i+2$

$a+bi=4+3i$

$$\Rightarrow \begin{cases} a=4 \\ b=3 \end{cases}$$

$a-b=4-3=1$

Yanıt / Answer C

16. $i^{2012}-i^{2013}+i^{2014}-i^{2015}$

$=i^0-i^1+i^2-i^3$

$=1-i-1+i$

$=0$

Yanıt / Answer C

1. $3 - 2i = x + 2yi \Rightarrow$ **y = ?**

A) 2 B) –2 C) 1 D) –1 E) 0

2. $z = \dfrac{\sqrt{-4} \cdot \sqrt{-9}}{1 + \sqrt{-1}} \Rightarrow \mathbf{z = a + bi = ?}$

A) –3 + 6i B) –3 + 3i C) 3 – 6i D) 3 – 3i E) –3 – 3i

3. $z_1 = -2 - i, \quad z_2 = 3 + 4i$

$z = \dfrac{z_2}{z_1} \Rightarrow \mathbf{z = ?}$

A) 1 – i B) 1 + i C) 2 – i D) 2 + i E) –2 – i

4. $z = \dfrac{2+3i}{3-2i} \Rightarrow \mathbf{Im(z^{-1}) = ?}$

A) –13 B) –1 C) 0 D) 1 E) 13

5. $z = \dfrac{i^{86} - i^{92}}{i^{97} - i^{107}} \Rightarrow \mathbf{z = ?}$

A) 1 B) i C) 1 + i D) 1 – i E) 2i

6. $z = \dfrac{1}{1-i} + \dfrac{1}{2+i} \Rightarrow \mathbf{Im(z) = ?}$

A) $\dfrac{3}{10}$ B) $\dfrac{3}{7}$ C) $\dfrac{3}{5}$ D) $\dfrac{3}{4}$ E) $\dfrac{3}{2}$

7. $z = \dfrac{1}{1+i} - \dfrac{1}{1-i} \Rightarrow \mathbf{Im(z) = ?}$

A) –2 B) –1 C) 0 D) 1 E) 2

8. $z = \dfrac{3-2i}{2+3i} \Rightarrow \mathbf{Re(z) = ?}$

A) –1 B) 0 C) $\dfrac{12}{13}$ D) 1 E) 3

9. $\frac{1}{2+i}-\frac{1-i}{3-i}=?$

A) –1 B) 2 – i C) 1+i D) 2+i E) 0

10. $\frac{\sqrt{3}+i}{\sqrt{3}-i}+\frac{\sqrt{3}-i}{\sqrt{3}+i}=?$

A) –1 B) –i C) 1 D) i E) $\sqrt{3}i$

11. $z=\frac{1+i}{3+i} \Rightarrow z^{-1}=?$

A) 2 + i B) 2 – i C) 1 + i D) 1 – i E) 3 – i

12. $(1+i)^{10}=A \Rightarrow A=?$

A) –32i B) –16i C) 16i D) 32i E) 64i

13. $z=\frac{(1+i)^{21}}{(1-i)^{16}} \Rightarrow z=?$

A) –4 – 4i B) 4 – 4i C) –4 + 4i

D) 4 + 4i E) –4 – 2i

14. $z=\frac{(3-\sqrt{7}\cdot i)^{13}}{(\sqrt{7}+3i)^{12}} \Rightarrow |z|=?$

A) $\sqrt{2}$ B) $\sqrt{3}$ C) 2 D) 3 E) 4

15. $z=\frac{(1+i)^{4}(4-3i)}{\sqrt{3}+i} \Rightarrow |z|=?$

A) 20 B) 10 C) 5 D) $10\sqrt{2}$ E) $5\sqrt{2}$

16. $\left.\begin{matrix} z_1=2-3i \\ z_2=3+i \end{matrix}\right\} \Rightarrow \frac{z_2}{z_1}=?$

A) $\frac{3}{13}-\frac{11}{13}i$ B) $\frac{3}{13}+\frac{11}{13}i$ C) $\frac{4}{13}-\frac{7}{13}i$

D) $\frac{4}{5}-\frac{11}{5}i$ E) $-\frac{4}{5}+\frac{11}{5}i$

[MARMARA ÜNV. YÖS 2013]

Yanıtlar / Answers

1. D	4. B	7. B	10. C	13. A	16. B
2. B	5. B	8. B	11. B	14. E	
3. E	6. A	9. E	12. D	15. B	

1. $3-2i=x+2yi$

$\Rightarrow\ -2=2y\ \Rightarrow\ y=-1$

Yanıt / Answer D

---

2. $z=\dfrac{\sqrt{-4}\cdot\sqrt{-9}}{1+\sqrt{-1}}=\dfrac{2i\cdot 3i}{1+i}$

$=\dfrac{-6}{\underset{(1-i)}{1+i}}=\dfrac{-6(1-i)}{1-i^2}$

$=\dfrac{-6(1-i)}{2}=-3+3i$

Yanıt / Answer B

---

3. $z_1=-2-i,\ z_2=3+4i$

$z=\dfrac{3+4i}{-2-i}$

$=\dfrac{(3+4i)\cdot(-2+i)}{(-2-i)\cdot(-2+i)}$

$=\dfrac{-6-8i+3i+4i^2}{4-i^2}$

$=\dfrac{-10-5i}{5}=-2-i$

Yanıt / Answer E

---

4. $z=\dfrac{2+3i}{3-2i}=\dfrac{(2+3i)\cdot(3+2i)}{(3-2i)\cdot(3+2i)}$

$z=\dfrac{6+9i+4i+6i^2}{9-4i^2}$

$=\dfrac{6+13i-6}{13}=\dfrac{13i}{13}=i$

$z^{-1}=\dfrac{1}{i}\ \Rightarrow\ z^{-1}=\dfrac{i}{i^2}=-i\ \Rightarrow\ \mathrm{Im}(z^{-1})=-1$

Yanıt / Answer B

5.

$$\begin{array}{r|l} 86 & 4 \\ -\ 84 & 21 \\ \hline 2 & \end{array}\qquad \begin{array}{r|l} 92 & 4 \\ -\ 92 & 23 \\ \hline 0 & \end{array}\qquad \begin{array}{r|l} 97 & 4 \\ -\ 96 & 24 \\ \hline 1 & \end{array}\qquad \begin{array}{r|l} 107 & 4 \\ -\ 104 & 26 \\ \hline 3 & \end{array}$$

$z=\dfrac{i^{86}-i^{92}}{i^{97}-i^{107}}=\dfrac{i^2-i^0}{i^1-i^3}\Rightarrow\ z=\dfrac{-1-1}{i+i}=\dfrac{-1-1}{2i}$

$z=\dfrac{-2}{2i}=\dfrac{-1}{i}=\dfrac{-i}{i^2}=\dfrac{-i}{-1}=i$

Yanıt / Answer B

---

6. $z=\dfrac{1}{\underset{(1+i)}{1-i}}+\dfrac{1}{\underset{(2-i)}{2+i}}$

$=\dfrac{1+i}{1-i^2}+\dfrac{2-i}{4-i^2}$

$=\dfrac{1+i}{2}+\dfrac{2-i}{5}$

$=\dfrac{5+5i+4-2i}{10}$

$=\dfrac{9}{10}+\dfrac{3}{10}i\ \Rightarrow\ \mathrm{Im}(z)=\dfrac{3}{10}$

Yanıt / Answer A

---

7. $z=\dfrac{1}{\underset{(1-i)}{1+i}}-\dfrac{1}{\underset{(1+i)}{1-i}}$

$=\dfrac{(1-i)}{1-i^2}-\dfrac{1+i}{1-i^2}$

$=\dfrac{1-i}{2}-\dfrac{1+i}{2}$

$=\dfrac{1-i-1-i}{2}$

$=\dfrac{-2i}{2}=-i\ \Rightarrow\ \mathrm{Im}(z)=-1$

Yanıt / Answer B

---

8. $z=\dfrac{3-2i}{2+3i}$

$=\dfrac{(3-2i)(2-3i)}{(2+3i)(2-3i)}$

$=\dfrac{6-9i-4i+6i^2}{4-9i^2}$

$=\dfrac{-13i}{13}=-i=0-i\ \Rightarrow\ \mathrm{Re}(z)=0$

Yanıt / Answer B

9. $$\frac{1}{\underset{(2-i)}{2+i}}-\frac{1-i}{\underset{(3+i)}{3-i}}=\frac{2-i}{4-i^2}-\frac{(1-i)(3+i)}{9-i^2}$$

$$=\frac{2-i}{5}-\frac{3+i-3i-i^2}{10}$$

$$=\frac{2-i}{5}-\frac{4-2i}{10}$$

$$=\frac{2-i}{5}-\frac{2-i}{5}$$

$$=\frac{2-i-2+i}{5}=\frac{0}{5}=0$$

Yanıt / Answer E

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10. $$\frac{\sqrt{3}+i}{\underset{(\sqrt{3}+i)}{\sqrt{3}-i}}+\frac{\sqrt{3}-i}{\underset{(\sqrt{3}-i)}{\sqrt{3}+i}}=\frac{(\sqrt{3}+i)^2}{3+1}+\frac{(\sqrt{3}-i)^2}{3+1}$$

$$=\frac{3+2\sqrt{3}i+i^2+3-2\sqrt{3}i+i^2}{4}$$

$$=\frac{4}{4}=1$$

Yanıt / Answer C

---

11. $$z=\frac{1+i}{3+i}\Rightarrow z^{-1}=\frac{3+i}{1+i}$$

$$=\frac{(3+i)\cdot(1-i)}{1-i^2}$$

$$=\frac{3-3i+i+1}{2}$$

$$=\frac{4-2i}{2}=\frac{2(2-i)}{2}=2-i$$

Yanıt / Answer B

---

12. $$A=(1+i)^{10}$$

$$=\left[(1+i)^2\right]^5$$

$$=\left[1+2i+i^2\right]^5$$

$$=[1+2i-1]^5$$

$$=2^5\cdot i^5\Rightarrow 32i$$

Yanıt / Answer D

---

13. $$z=\frac{(1+i)^{20}\cdot(1+i)}{\left[(1-i)^2\right]^8}$$

$$=\frac{\left[(1+i)^2\right]^{10}(1+i)}{\left[1-2i+i^2\right]^8}$$

$$=\frac{(1+2i+i^2)^{10}(1+i)}{(-2i)^8}$$

$$=\frac{(2i)^{10}(1+i)}{2^8\cdot i^8}$$

$$=\frac{2^{10}\cdot i^2(1+i)}{2^8}=-2^2(1+i)=-4-4i$$

Yanıt / Answer A

---

14. $$z=\frac{(3-\sqrt{7}i)^{13}}{(\sqrt{7}+3i)^{12}}\Rightarrow |z|=\frac{(\sqrt{9+7})^{13}}{(\sqrt{7+9})^{12}}$$

$$=\frac{(\sqrt{16})^{13}}{(\sqrt{16})^{12}}$$

$$=\sqrt{16}=\sqrt{4^2}=4$$

Yanıt / Answer E

---

15. $$z=\frac{(1+i)^4\cdot(4-3i)}{\sqrt{3}+i}$$

$$\Rightarrow |z|=\frac{(\sqrt{1+1})^4(\sqrt{16+9})}{\sqrt{3+1}}$$

$$=\frac{4\cdot 5}{2}=10$$

Yanıt / Answer B

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16. $$\frac{z_2}{z_1}=\frac{3+i}{\underset{(2+3i)}{2-3i}}$$

$$=\frac{(3+i)(2+3i)}{(2-3i)(2+3i)}$$

$$=\frac{3+11i}{13}$$

$$=\frac{3}{13}+\frac{11}{13}i$$

Yanıt / Answer B

1. $z=\dfrac{(2-\sqrt{3}\,i)\cdot(\sqrt{2}+i)^3}{\sqrt{23}+2i} \Rightarrow |z|=?$

A) $2\sqrt{3}$ B) $\sqrt{3}$ C) $\sqrt{5}$ D) $\sqrt{6}$ E) $\sqrt{7}$

2. $z=\dfrac{(3+4i)\,(2+i)}{2-i} \Rightarrow |z|=?$

A) 1 B) 2 C) 5 D) 10 E) 25

3. $z+2\cdot\bar{z}=3+2\sqrt{2}\,i \Rightarrow |z|=?$

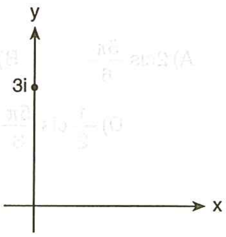
A) 2 B) 3 C) 4 D) 5 E) 6

4. $z=\sqrt{2}+\sqrt{2}\,i \Rightarrow \arg(z)=\alpha=?$

A) $\dfrac{\pi}{6}$ B) $\dfrac{\pi}{4}$ C) $\dfrac{\pi}{2}$ D) π E) $\dfrac{3\pi}{2}$

5. $z=3i$

$\Rightarrow z=r\,\mathrm{cis}\theta=?$



A) $3\,\mathrm{cis}\,\pi$ B) $3\,\mathrm{cis}\,\dfrac{\pi}{2}$ C) $9\,\mathrm{cis}\,\pi$ D) $9\,\mathrm{cis}\,\dfrac{\pi}{2}$ E) $3\,\mathrm{cis}\,\dfrac{\pi}{4}$

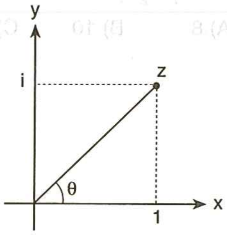
6. $z=\sqrt{3}-i \Rightarrow z=r\,\mathrm{cis}\alpha=?$

A) $2\,\mathrm{cis}\,\dfrac{\pi}{3}$ B) $2\,\mathrm{cis}\,\dfrac{\pi}{6}$ C) $2\,\mathrm{cis}\,\dfrac{5\pi}{6}$ D) $2\,\mathrm{cis}\,\dfrac{7\pi}{6}$ E) $2\,\mathrm{cis}\,\dfrac{11\pi}{6}$

7. $z=1+i$

$z=r\,\mathrm{cis}\theta$

$\Rightarrow z=?$



A) $\mathrm{cis}\,\dfrac{\pi}{2}$ B) $2\,\mathrm{cis}\,\dfrac{\pi}{2}$ C) $\sqrt{2}\,\mathrm{cis}\,\dfrac{\pi}{2}$ D) $2\,\mathrm{cis}\,\dfrac{\pi}{4}$ E) $\sqrt{2}\,\mathrm{cis}\,\dfrac{\pi}{4}$

8. $\left.\begin{array}{l} z_1=2\mathrm{cis}\dfrac{\pi}{10} \\ z_2=\dfrac{5}{6}\mathrm{cis}\dfrac{2\pi}{5} \end{array}\right\} \Rightarrow z_1\cdot z_2=?$

A) $\dfrac{5}{3}$ B) $\dfrac{5}{3}\,\mathrm{cis}\dfrac{\pi}{3}$ C) $\dfrac{5}{3}i$ D) $\dfrac{5}{3}\,\mathrm{cis}\dfrac{\pi}{5}$ E) $-\dfrac{5}{3}i$

9. $z = 2\cdot\left(\cos\frac{\pi}{6} + i\sin\frac{\pi}{6}\right) \Rightarrow \frac{1}{z} = ?$

A) $2\text{cis}\frac{5\pi}{6}$ B) $\frac{1}{4}\text{cis}\frac{7\pi}{6}$ C) $\frac{1}{2}\text{cis}\frac{\pi}{6}$

D) $\frac{1}{2}\text{cis}\frac{5\pi}{3}$ E) $\frac{1}{2}\text{cis}\frac{11\pi}{6}$

10. $z = 1 + i \Rightarrow z^6 - (\bar{z})^6 = ?$

A) $-16i$ B) $-8i$ C) 0 D) $8i$ E) $16i$

11. $z_1 = 4 - 3i$,

$z_2 = -3$

$\Rightarrow |z_1 \cdot z_2| = ?$

A) 8 B) 10 C) 12 D) 15 E) 18

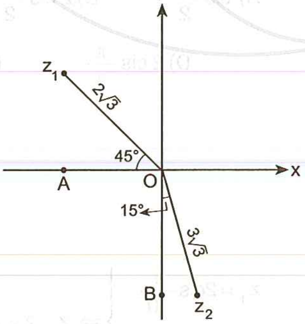
12. $|z_1| = 2\sqrt{3}$,

$|z_2| = 3\sqrt{3}$

$m(\widehat{AOZ_1}) = 45°$,

$m(\widehat{BOZ_2}) = 15°$

$\Rightarrow \frac{z_1}{z_2} = ?$



A) $\frac{\sqrt{3}}{3} + \frac{\sqrt{2}}{3}i$ B) $-\frac{\sqrt{3}}{3} - \frac{1}{3}i$ C) $\frac{1}{3} + \frac{\sqrt{3}}{3}i$

D) $\frac{\sqrt{3}}{2} - \frac{1}{2}i$ E) $-\frac{\sqrt{3}}{3} + \frac{1}{3}i$

13. $z_1 = -3 - 4i$,

$z_2 = 6 + 8i$

$\Rightarrow |z_1 - z_2| = ?$

A) 10 B) 12 C) 15 D) 18 E) 20

14. $z_1 = 1 + 4i,\ z_2 = 1 - 2i \Rightarrow \left|\frac{z_1 + \bar{z}_2}{z_2 + \bar{z}_1}\right| = ?$

A) $\sqrt{2}$ B) 2 C) $\sqrt{3}$ D) $\frac{\sqrt{3}}{3}$ E) 1

15. $2z + \bar{z} - 3 - 2i = 6 + 3i \Rightarrow z^{-1} = ?$

A) $\frac{3}{25} - \frac{1}{5}i$ B) $\frac{3}{28} + \frac{4}{25}i$ C) $\frac{3}{34} - \frac{5}{34}i$

D) $\frac{1}{7} - \frac{1}{5}i$ E) $\frac{1}{2} + \frac{\sqrt{3}}{4}i$

16. $i = \sqrt{-1}$

$(1 + 3i)^{15} = a - bi$

$\Rightarrow (1 - 3i)^{15} = ?$

A) $a + bi$ B) $2abi$ C) $a - bi$

D) $(a + bi)^2$ E) $-a - bi$

[YTÜ.YÖS 2013]

Yanıtlar / Answers

1. E	4. B	7. E	10. A	13. C	16. A
2. C	5. B	8. C	11. D	14. E	
3. B	6. E	9. E	12. B	15. C	

1. $$z=\frac{(2-\sqrt{3}\,i)\cdot(\sqrt{2}+i)^3}{\sqrt{23}+2i}$$

$$\Rightarrow |z|=\frac{(\sqrt{4+3})\cdot(\sqrt{2+1})^3}{\sqrt{23+4}}$$

$$=\frac{\sqrt{7}\cdot\sqrt{27}}{\sqrt{27}}=\sqrt{7}$$

Yanıt / Answer E

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2. $$z=\frac{(3+4i)\cdot(2+i)}{2-i}$$

$$\Rightarrow |z|=\frac{\sqrt{9+16}\cdot\sqrt{4+1}}{\sqrt{4+1}}=5$$

Yanıt / Answer C

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3. $z=a+bi \Rightarrow \bar{z}=a-bi$

$z+2\bar{z}=3+2\sqrt{2}\,i$

$a+bi+2a-2bi=3+2\sqrt{2}\,i$

$3a-bi=3+2\sqrt{2}\,i$

$$\Rightarrow \begin{cases} 3a=3 \Rightarrow a=1 \\ b=-2\sqrt{2} \end{cases}$$

$z=1-2\sqrt{2}\,i \Rightarrow |z|=\sqrt{1+8}=\sqrt{9}=3$

Yanıt / Answer B

---

4. $$z=\sqrt{2}+\sqrt{2}\,i \Rightarrow \tan\alpha=\frac{\text{Im}(z)}{\text{Re}(z)}=\frac{\sqrt{2}}{\sqrt{2}}=1$$

$$\Rightarrow \alpha=\frac{\pi}{4}$$

Yanıt / Answer B

---

5. $z=0+3i \Rightarrow |z|=\sqrt{0^2+3^2}=3$

$$\tan\alpha=\frac{\text{Im}(z)}{\text{Re}(z)}=\frac{3}{0}=\text{(tanımsız / indefinite)}$$

$$\alpha=\frac{\pi}{2} \Rightarrow z=3\,\text{cis}\frac{\pi}{2}$$

Yanıt / Answer B

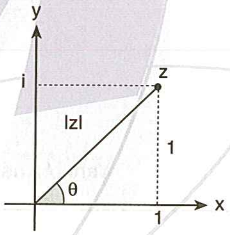
---

6. $z=\sqrt{3}-i$

$$\left.\begin{aligned} &\tan\alpha=\frac{1}{\sqrt{3}} \Rightarrow \alpha=\frac{\pi}{6} \\ &\text{Arg}(z)=2\pi-\frac{\pi}{6}=\frac{11\pi}{6} \\ &|z|=\sqrt{3+1}=2 \end{aligned}\right\} \Rightarrow z=2\,\text{cis}\frac{11\pi}{6}$$

Yanıt / Answer E

7.



$$\left.\begin{aligned} &\tan\theta=\frac{1}{1}=1 \\ &\Rightarrow \theta=\frac{\pi}{4} \\ &|z|=\sqrt{1+1}=\sqrt{2} \end{aligned}\right\}$$

$$z=\sqrt{2}\,\text{cis}\frac{\pi}{4}$$

Yanıt / Answer E

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8. $$z_1=2\,\text{cis}\frac{\pi}{10},\quad z_2=\frac{5}{6}\,\text{cis}\frac{2\pi}{5} \Rightarrow$$

$$z_1\cdot z_2=2\cdot\frac{5}{6}\,\text{cis}\left(\frac{\pi}{10}+\frac{4\pi}{10}\right)$$

$$=\frac{5}{3}\,\text{cis}\frac{\pi}{2}$$

$$=\frac{5}{3}\left(\underbrace{\cos\frac{\pi}{2}}_{0}+i\underbrace{\sin\frac{\pi}{2}}_{1}\right) \Rightarrow z_1\cdot z_2=\frac{5}{3}i$$

Yanıt / Answer C

9. $z = 2\text{cis}\dfrac{\pi}{6} \Rightarrow \dfrac{1}{z} = z^{-1} = 2^{-1}\cdot\text{cis}\left(\dfrac{-\pi}{6}\right)$

$$= \frac{1}{2}\text{cis}\left(2\pi - \frac{\pi}{6}\right)$$

$$= \frac{1}{2}\text{cis}\frac{11\pi}{6}$$

Yanıt / Answer E

10. $z = 1+i \Rightarrow \bar{z} = 1-i$

$$z^6 - (\bar{z})^6 = [(1+i)^2]^3 - [(1-i)^2]^3$$

$$= (2i)^3 - (-2i)^3$$

$$= 2^3 i^3 + 2^3 i^3$$

$$= -8i - 8i = -16i$$

Yanıt / Answer A

11. $z_1 = 4-3i \Rightarrow |z_1| = \sqrt{4^2 + (-3)^2} = 5$

$z_2 = -3 \Rightarrow |z_2| = \sqrt{(-3)^2 + 0^2} = 3$

$|z_1 \cdot z_2| = |z_1| \cdot |z_2| = 5 \cdot 3 = 15$

Yanıt / Answer D

12. $|z_1| = 2\sqrt{3}$, $\text{Arg}z_1 = 180° - 45° = 135°$

$\Rightarrow z_1 = 2\sqrt{3}\ \text{cis}135°$

$|z_2| = 3\sqrt{3}$ $\text{Arg}z_2 = 270° + 15° = 285° \Rightarrow z_2 = 3\sqrt{3}\ \text{cis}285°$

$$\frac{z_1}{z_2} = \frac{2\sqrt{3}\ \text{cis}135°}{3\sqrt{3}\ \text{cis}285°} = \frac{2}{3}\text{cis}(135° - 285°)$$

$$= \frac{2}{3}\text{cis}(-150°)$$

$$= \frac{2}{3}(\cos(-150°) + i\sin(-150°))$$

$$= \frac{2}{3}(\cos 150° - i\sin 150°)$$

$$= \frac{2}{3}[-\cos 30° - i\sin 30°]$$

$$= \frac{2}{3}\left(-\frac{\sqrt{3}}{2} - \frac{1}{2}i\right) = -\frac{\sqrt{3}}{3} - \frac{i}{3}$$

Yanıt / Answer B

13.

$$\begin{array}{rl} & z_1 = -3 - 4i \\ + & -1/\ z_2 = 6 + 8i \\ \hline & z_1 - z_2 = -9 - 12i \\ & |z_1 - z_2| = \sqrt{81+144} \\ & = 15 \end{array}$$

Yanıt / Answer C

14. $z_1 = 1+4i,\ z_2 = 1-2i$

$$\Rightarrow \left|\frac{z_1 + \bar{z}_2}{z_2 + \bar{z}_1}\right| = \left|\frac{1+4i+1+2i}{1-2i+1-4i}\right|$$

$$= \left|\frac{2+6i}{2-6i}\right| = \frac{\sqrt{4+36}}{\sqrt{4+36}} = \frac{\sqrt{40}}{\sqrt{40}} = 1$$

Yanıt / Answer E

15. $z = a + bi \Rightarrow \bar{z} = a - bi$

$2\cdot z + \bar{z} - 3 - 2i = 6 + 3i$

$2a + 2bi + a - bi - 3 - 2i = 6 + 3i$

$(3a-3) + (b-2)i = 6 + 3i$

$$\Rightarrow \begin{cases} 3a - 3 = 6 \Rightarrow a = 3 \\ b - 2 = 3 \Rightarrow b = 5 \end{cases}$$

$z = 3 + 5i \Rightarrow z^{-1} = \dfrac{1}{3+5i}$

$$z^{-1} = \frac{3-5i}{9+25} = \frac{3}{34} - \frac{5}{34}i$$

Yanıt / Answer C

16. $i = \sqrt{-1}$

$(1 + 3i)^{15} \cdot (1 - 3i)^{15} = 10^{15}$

$10^{15} \in Q$

$(a - bi)\ (a + bi) \in Q$

$\Rightarrow (1 - 3i)^{15} = a + bi$

Yanıt / Answer A

LOGARİTMA
LOGARITHM

BÖLÜM
CHAPTER
4

Logaritma / Logarithm

Test 1

1. $\log_{\frac{1}{5}} x = -2 \Rightarrow x = ?$

A) $\frac{1}{25}$ B) $\frac{1}{5}$ C) 5 D) 25 E) 125

2. $\log_7 [\log_3 (x+1)] = 0 \Rightarrow x = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

3. $\log_3 [6 + \log_3 (x-1)] = 2 \Rightarrow x = ?$

A) 25 B) 26 C) 27 D) 28 E) 29

4. $\log_{\sqrt{5}} [\log_2 (x-3)] = 2 \Rightarrow x = ?$

A) 8 B) 16 C) 19 D) 32 E) 35

5. $\log_{\frac{1}{3}} 27^x = 9 \Rightarrow x = ?$

A) –3 B) –2 C) –1 D) 2 E) 3

6. $\log_2 [\log (3x-5)] = 0 \Rightarrow x = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

7. $\log_4 [\log_3 (\ln x)] = 0 \Rightarrow x = ?$

A) e B) e^2 C) e^3 D) e^4 E) e^5

8. $0 < x \le \frac{\pi}{2}$,

$\log\left(\frac{3}{2} - \cos x\right) = 0 \Rightarrow x = ?$

A) $\frac{\pi}{8}$ B) $\frac{\pi}{6}$ C) $\frac{\pi}{4}$ D) $\frac{\pi}{3}$ E) $\frac{\pi}{2}$

9. $\log_3 \sqrt[4]{9} = x \Rightarrow$ **$x = ?$**

A) $\frac{1}{9}$ B) $\frac{1}{3}$ C) $\frac{1}{2}$ D) 2 E) 3

10. $\log 2 = a \Rightarrow$ **$\log 400 = ?$**

A) 2a B) 4a C) 2 + a
D) 2 + 2a E) 2 + 4a

11. **$\log_2 3 \cdot \log_9 8 = ?$**

A) $\frac{1}{2}$ B) 1 C) $\frac{3}{2}$ D) 2 E) $\frac{5}{2}$

12. $\log_{\sqrt{3}} 27 = x \Rightarrow$ **$x = ?$**

A) 3 B) 6 C) 9 D) 12 E) 18

13. $\log 5 = x \Rightarrow$ **$\log 20 = ?$**

A) –2x B) 1 – x C) 2 – x
D) 2 + x E) 2x

14. **$\log_3 4 \cdot \log_4 25 \cdot \ln 5 \cdot \log_3 e = ?$**

A) 1 B) 2 C) $\log_2 e$
D) $2(\log_3 5)^2$ E) $\log_3 125$

15. **$\log_2 [\log_3 25 \cdot \log_5 81] = ?$**

A) 3 B) 4 C) 5 D) 6 E) 8

16. $\log a + \log b = 1$,
$a^2 + b^2 = 44 \Rightarrow$ **$|a + b| = ?$**

A) 5 B) 6 C) 7
D) 8 E) 9

[ANKARA ÜNV. YÖS 2013]

Yanıtlar / Answers

1. D	4. E	7. C	10. D	13. C	16. D
2. C	5. A	8. D	11. C	14. D	
3. D	6. D	9. C	12. B	15. A	

1. $\log_{\frac{1}{5}} x = -2 \Rightarrow x = \left(\frac{1}{5}\right)^{-2} = 25$

Yanıt / Answer D

2. $\log_7 [\log_3 (x+1)] = 0 \Rightarrow \log_3 (x+1) = 7^0 = 1$

$$x + 1 = 3$$
$$x = 2$$

Yanıt / Answer C

3. $\log_3 [6 + \log_3 (x-1)] = 2$

$$6 + \log_3 (x-1) = 3^2$$
$$\log_3 (x-1) = 3$$
$$x - 1 = 3^3$$
$$x - 1 = 27$$
$$x = 28$$

Yanıt / Answer D

4. $\log_{\sqrt{5}} [\log_2 (x-3)] = 2$

$$\log_2 (x-3) = \left(5^{\frac{1}{2}}\right)^2$$
$$\log_2 (x-3) = 5$$
$$x - 3 = 2^5$$
$$x = 35$$

Yanıt / Answer E

5. $\log_{\frac{1}{3}} 27^x = 9$

$$27^x = (3^{-1})^9$$
$$3^{3x} = 3^{-9}$$
$$3x = -9$$
$$x = -3$$

Yanıt / Answer A

6. $\log_2 [\log (3x-5)] = 0$

$$\log (3x-5) = 1$$
$$3x - 5 = 10$$
$$3x = 15$$
$$x = 5$$

Yanıt / Answer D

7. $\log_4 [\log_3 (\ln x)] = 0$

$$\log_3 (\ln x) = 1$$
$$\ln x = 3$$
$$x = e^3$$

Yanıt / Answer C

8. $\log\left(\frac{3}{2} - \cos x\right) = 0$

$$\frac{3}{2} - \cos x = 1$$
$$\cos x = \frac{3}{2} - 1$$
$$\cos x = \frac{1}{2}$$
$$0 < x < \frac{\pi}{2} \Rightarrow x = \frac{\pi}{3}$$

Yanıt / Answer D

1. $\log_{\frac{1}{5}} x = -2 \Rightarrow x = \left(\frac{1}{5}\right)^{-2} = 25$

Yanıt / Answer D

2. $\log_7 [\log_3 (x + 1)] = 0 \Rightarrow \log_3 (x + 1) = 7^0 = 1$

$x + 1 = 3$

$x = 2$

Yanıt / Answer C

3. $\log_3 [6 + \log_3 (x - 1)] = 2$

$6 + \log_3 (x - 1) = 3^2$

$\log_3 (x - 1) = 3$

$x - 1 = 3^3$

$x - 1 = 27$

$x = 28$

Yanıt / Answer D

4. $\log_{\sqrt{5}} [\log_2 (x-3)] = 2$

$\log_2 (x-3) = \left(5^{\frac{1}{2}}\right)^2$

$\log_2 (x-3) = 5$

$x-3 = 2^5$

$x = 35$

Yanıt / Answer E

5. $\log_{\frac{1}{3}} 27^x = 9$

$27^x = (3^{-1})^9$

$3^{3x} = 3^{-9}$

$3x = -9$

$x = -3$

Yanıt / Answer A

6. $\log_2 [\log (3x - 5)] = 0$

$\log (3x - 5) = 1$

$3x - 5 = 10$

$3x = 15$

$x = 5$

Yanıt / Answer D

7. $\log_4 [\log_3 (\ln x)] = 0$

$\log_3 (\ln x) = 1$

$\ln x = 3$

$x = e^3$

Yanıt / Answer C

8. $\log \left(\frac{3}{2} - \cos x\right) = 0$

$\frac{3}{2} - \cos x = 1$

$\cos x = \frac{3}{2} - 1$

$\cos x = \frac{1}{2}$

$0 < x < \frac{\pi}{2} \Rightarrow x = \frac{\pi}{3}$

Yanıt / Answer D

9. $\log_3 \sqrt[4]{9} = x$

$3^x = \sqrt[4]{9}$

$3^x = (3^2)^{\frac{1}{4}}$

$3^x = 3^{\frac{1}{2}}$

$x = \frac{1}{2}$

Yanıt / Answer C

10. $\log 2 = a$

$\log 400 = \log (4 \cdot 100)$

$= \log 4 + \log 100$

$= \log 2^2 + \log 10^2$

$= 2\log 2 + 2\log 10$

$= 2 \cdot a + 2$

Yanıt / Answer D

11. $\log_2 3 \cdot \log_9 8 = \log_2 3 \cdot \log_{3^2} 2^3$

$= \log_2 3 \cdot \frac{3}{2} \log_3 2$

$= \frac{3}{2} \log_2 3 \log_3 2$

$= \frac{3}{2} \log_2 2$

$= \frac{3}{2}$

Yanıt / Answer C

12. $\log_{\sqrt{3}} 27 = x \Rightarrow \log_{3^{\frac{1}{2}}} 3^3 = \frac{3}{\frac{1}{2}} \log_3 3 = 6$

Yanıt / Answer B

13. $x = \log 5 = \log \left(\frac{10}{2}\right)$

$= \log 10 - \log 2$

$\log 2 = 1 - x$

$\log 20 = \log (4 \cdot 5)$

$= \log 4 + \log 5$

$= 2\log 2 + \log 5$

$= 2(1 - x) + x$

$= 2 - x$

Yanıt / Answer C

14. $\log_3 4 \cdot \log_4 25 \cdot \ln 5 \cdot \log_3 e$

$= \log_3 25 \cdot \log_e 5 \cdot \log_3 e$

$= \log_3 25 \cdot \log_3 e \cdot \log_e 5$

$= \log_3 5^2 \cdot \log_3 5$

$= 2(\log_3 5)^2$

Yanıt / Answer D

15. $\log_2 [\log_3 25 \cdot \log_5 81] = \log_2 (\log_3 5^2 \cdot \log_5 3^4)$

$= \log_2 (2\log_3 5 \cdot 4\log_5 3)$

$= \log_2 (8 \cdot \log_3 3)$

$= \log_2 2^3$

$= 3$

Yanıt / Answer A

16. $\log a + \log b = 1$

$\log(a \cdot b) = 1$

$a \cdot b = 10$

$a^2 + b^2 = (a+b)^2 - 2ab$

$44 = (a+b)^2 - 20$

$64 = (a+b)^2$

$8 = |a+b|$

Yanıt / Answer D

9. $\log_3 (2x+1) = \log_3 (x-2) + 1$

$\Rightarrow$ **x = ?**

A) 1 B) 3 C) 4 D) 5 E) 7

10. $3^{12} \cdot x = x^{\log_3 x}$

ÇK(SS) = $\{x_1, x_2\}$

$\Rightarrow$ **$x_1 \cdot x_2$ = ?**

A) 3 B) 6 C) 9 D) 27 E) 36

11. $\log_{\frac{1}{2}} 0{,}25 = x \Rightarrow$ **x = ?**

A) –2 B) –1 C) 1 D) 2 E) 4

12. $\left.\begin{array}{l} \ln \dfrac{x}{y} = 3 \\ \ln x^2 y = 6 \end{array}\right\} \Rightarrow$ **x + y = ?**

A) e^3 B) e^4 C) $e^3 + 1$

D) $e^3 + 2$ E) 3

13. $\log_4 3 = a,\ \log_{25} 27 = b \Rightarrow$ **$\log_5 8$ = ?**

A) $a \cdot b$ B) $\dfrac{b}{a}$ C) $\dfrac{a}{b}$ D) $\dfrac{b}{3a}$ E) $\dfrac{a}{3b}$

14. $\log 5 = x \Rightarrow$ **$\log \dfrac{1}{4}$ = ?**

A) x – 1 B) 2x – 1 C) 2x – 2

D) x – 2 E) 3x – 2

15. $\log_2 25 \cdot \ln 2 \cdot \log_5 e = A \Rightarrow$ **A = ?**

A) 0 B) 1 C) 2 D) 3 E) 4

16. $\log_2 [2 + \log_3 (2x-1)] = 2$

x = ?

A) 1 B) 2 C) 3 D) 4 E) 5

[KTÜ. YÖS 2013]

Yanıtlar / Answers

1. B	4. A	7. B	10. A	13. B	16. E
2. B	5. E	8. A	11. D	14. C	
3. D	6. E	9. E	12. C	15. C	

1.
$$\log_x 0{,}04 = -2$$
$$x^{-2} = \frac{4}{100}$$
$$x^2 = \frac{100}{4} = 25$$
$$x = 5$$

Yanıt / Answer B

2.
$$\log_2 3 = x$$
$$\log_{\sqrt{4}} 27 = \log_2 3^3$$
$$= 3\log_2 3$$
$$= 3x$$

Yanıt / Answer B

3.
$$\ln(a\cdot b) = 5 \quad \Rightarrow \quad \ln a + \ln b = 5$$
$$\ln\left(\frac{a}{b}\right) = 3 \quad \Rightarrow \quad \underline{+\ \ln a - \ln b = 3}$$
$$2\ln a = 8$$
$$\ln a = 4$$
$$a = e^4$$

Yanıt / Answer D

4. log 2 = a,

log 3 = b

$$\log 72 = \log(9\cdot 8)$$
$$= \log 9 + \log 8$$
$$= 2\cdot\log 3 + 3\log 2$$
$$= 3a + 2b$$

Yanıt / Answer A

5.
$$\log_3(4x-5) - \log_3(x+1) = 1$$
$$\log_3\left(\frac{4x-5}{x+1}\right) = 1$$
$$\frac{4x-5}{x+1} = 3$$
$$4x-5 = 3x+3$$
$$x = 8$$

Yanıt / Answer E

6.
$$\log 2x + \log(x-3) = 1 + \log 2$$
$$\log 2x + \log(x-3) = \log 10 + \log 2$$
$$2x\cdot(x-3) = 10\cdot 2$$
$$x\cdot(x-3) = 10$$
$$x = 5$$

Yanıt / Answer E

7.
$$\log 340 - \log 17 + \log 5$$
$$= \log\left(\frac{340\cdot 5}{17}\right)$$
$$= \log 100$$
$$= 2$$

Yanıt / Answer B

8. log 3 = a,

log 7 = b

$$\log 147 = \log 3 + \log 7^2$$
$$= \log 3 + 2\log 7$$
$$= a + 2b$$

$$\begin{array}{r|l} 147 & 3 \\ 49 & 7 \\ 7 & 7 \\ 1 & \end{array}$$

Yanıt / Answer A

9. $\log_3(2x+1)=\log_3(x-2)+1$

$\log_3(2x+1)-\log_3(x-2)=1$

$\log_3\left(\dfrac{2x+1}{x-2}\right)=1$

$\dfrac{2x+1}{x-2}=3$

$2x+1=3x-6$

$x=7$

Yanıt / Answer E

---

10. $3^{12}\cdot x=x^{\log_3 x}$

$\log_3(3^{12}\cdot x)=\log_3 x^{\log_3 x}$

$12+\log_3 x=\log_3 x\cdot\log_3 x$

$(\log_3 x)^2-\log_3 x-12=0$

$\log_3 x=4 \quad , \quad \log_3 x=-3$

$x=3^4 \quad , \quad x=3^{-3}$

$x_1\cdot x_2=3^4\cdot 3^{-3}=3$

Yanıt / Answer A

---

11. $\log_{\frac{1}{2}}0{,}25=x$

$\left(\dfrac{1}{2}\right)^x=\dfrac{1}{4}$

$x=2$

Yanıt / Answer D

---

12. $\ln\dfrac{x}{y}=3 \Rightarrow \quad \ln x-\ln y=3$

$\ln x^2y=6 \Rightarrow \quad +\ \underline{2\ln x+\ln y=6}$

$3\ln x=9$

$\ln x=3$

$x=e^3$

$\ln x-\ln y=3$

$3+\ln y=3$

$\ln y=0$

$y=1$

$\Rightarrow x+y=e^3+1$

Yanıt / Answer C

---

13. $\log_4 3=a \Rightarrow 3=2^{2a}$

$\log_{25}27=b \Rightarrow 3^3=5^{2b}$

$3^3=(2^{2a})^3=5^{2b}$

$2=5^{\frac{b}{3a}}$

$\log_5 2^3=\log_5(5^{\frac{b}{3a}})^3=\dfrac{b}{a}$

Yanıt / Answer B

---

14. $\log 5=x$

$\log\left(\dfrac{10}{2}\right)=x$

$\log 10-\log 2=x$

$1-\log 2=x$

$\log 2=1-x$

$\log\dfrac{1}{4}=\log 2^{-2}$

$=-2\log 2$

$=-2(1-x)$

$=2x-2$

Yanıt / Answer C

---

15. $\log_2 25\cdot\ln 2\cdot\log_5 e=\log_2 5^2\cdot\log_e 2\cdot\log_5 e$

$=2\log_2 5\cdot\log_5 e\cdot\log_e 2$

$=2\log_2 2$

$=2$

Yanıt / Answer C

---

16. $2+\log_3(2x-1)=2^2=4$

$\log_3(2x-1)=2$

$2x-1=3^2=9$

$2x=10$

$x=5$

Yanıt / Answer E

1. $\log_5 2 = a,\ \log_5 3 = b \Rightarrow \boldsymbol{\log_5 \sqrt[3]{24} = ?}$

A) $\frac{a+3b}{3}$　B) $\frac{3a+b}{3}$　C) $\frac{a+b}{3}$

D) $\frac{2a+b}{3}$　E) $\frac{a+2b}{3}$

2. $\log \frac{2x^3}{\sqrt{3}} = ?$

A) $\log 2 + \log 3x - \log 3$

B) $\log 2x + 3\log 3$

C) $\log 2 + 3\log x - 2\log 3$

D) $\log 2 - 3\log x + \frac{1}{2}\log 3$

E) $\log 2 + 3\log x - \frac{1}{2}\log 3$

3. $\left(\sqrt[3]{4}\right)^{\log_2 27} = x \Rightarrow x = ?$

A) $\frac{1}{9}$　B) $\frac{1}{3}$　C) 3　D) 9　E) 27

4. $\log 2 = a,\ \log 3 = b,\ \log 5 = c$

$\Rightarrow \log \frac{4\sqrt{5}}{27} = ?$

A) $2a + \frac{1}{2}c - 3b$　B) $2a - \frac{1}{2}b + 3c$

C) $2a - 2c - 3b$　D) $2a + \frac{1}{2}c + \frac{1}{3}b$

E) $2a + \frac{1}{2}c + 3b$

5. $\log 360 = a$,

$\log 2 = b$,

$\log 3 = c \Rightarrow \boldsymbol{\log 5 = ?}$

A) $a + 3b + 2c$　B) $a - 3b + 2c$

C) $a - 3b - 2c$　D) $a + 2b + 3c$

E) $a - 2b - 3c$

6. $\log_a x = 2$,

$\log_b x = 3 \Rightarrow \boldsymbol{\log_{a\cdot b} x = ?}$

A) $\frac{1}{6}$　B) $\frac{5}{6}$　C) $\frac{6}{5}$　D) 5　E) 6

7. $\log_2 9 = a$,

$\log_{25} 3 = b \Rightarrow \boldsymbol{\log_2 5 = ?}$

A) $4ab$　B) $2ab$　C) $\frac{a}{4b}$　D) $\frac{b}{4a}$　E) $\frac{a}{2b}$

8. $\log_2 3 = a,\ \log_5 2 = b \Rightarrow \boldsymbol{\log 15 = ?}$

A) $\frac{ab+1}{1+b}$　B) $\frac{ab-1}{1-b}$　C) $\frac{ab+1}{1-b}$

D) $\frac{ab-1}{1+b}$　E) $\frac{ab+1}{b}$

9. $\log_5 3 = a \Rightarrow \mathbf{\log_3 45 = ?}$

A) $\frac{2a-1}{a}$ B) $\frac{2a+1}{a}$ C) $\frac{a+1}{a}$

D) $\frac{a-1}{a}$ E) $\frac{1}{a}$

10. $x = \log_7 16 - \log_7 32$

$y = \log_2 7 \Rightarrow \mathbf{x \cdot y = ?}$

A) -2 B) -1 C) $-\frac{1}{2}$ D) 1 E) 2

11. $\log 3 = a,$

$\log 2 = b$

$\Rightarrow \mathbf{\log_6 24 = ?}$

A) $\frac{a+b}{a \cdot b}$ B) $\frac{a+b}{a-b}$ C) $\frac{a+3b}{a-b}$

D) $\frac{a+3b}{a+b}$ E) $\frac{a-3b}{a+b}$

12. $2 = 3^a,$

$5 = 3^b$

$\Rightarrow \mathbf{\log_3 90 = ?}$

A) a + b + 1 B) a + b + 2 C) 2a + b + 2

D) a + 2b + 2 E) 2a + 2b + 1

13. $\log_2 3 = a \Rightarrow \mathbf{\log_6 72 = ?}$

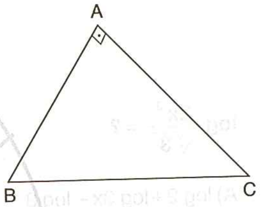
A) $\frac{3+2a}{1+a}$ B) $\frac{2+3a}{1+a}$ C) $\frac{1+2a}{3+a}$

D) $\frac{1+2a}{3-a}$ E) $\frac{3+2a}{1-a}$

14. $|AB| = \log_4 25,$

$|AC| = \log_5 64,$

$\Rightarrow \mathbf{A(\overset{\Delta}{ABC}) = ?\ cm^2}$



A) 3 B) 4 C) 5 D) 6 E) 7

15. $5^{\log_5 x} + 7^{\log_7 (2x-5)} = \log_2 16 \Rightarrow \mathbf{x = ?}$

A) 1 B) 2 C) 3 D) 4 E) 5

16. $\mathbf{\log_{25} \frac{1}{5} + \log_{\frac{1}{4}} 64 = ?}$

A) $-\frac{7}{2}$ B) $-\frac{2}{7}$ C) $\frac{7}{2}$

D) $\frac{2}{7}$ E) 1

[AKDENİZ ÜNV. YÖS 2013]

Yanıtlar / Answers

1. B	4. A	7. C	10. B	13. A	16. B
2. E	5. C	8. A	11. D	14. A	
3. D	6. C	9. B	12. B	15. C	

L

1. $\log_5 2 = a\ ,\ \ \log_5 3 = b$

$$\log_5 \sqrt[3]{24} = \log_5 (24)^{\frac{1}{3}}$$
$$= \frac{1}{3}(\log_5 2^3 + \log_5 3)$$
$$= \frac{1}{3}(3\log_5 2 + \log_5 3)$$
$$= \frac{3a+b}{3}$$

Yanıt / Answer B

2.
$$\log\frac{2x^3}{\sqrt{3}} = \log 2x^3 - \log\sqrt{3}$$
$$= \log 2 + \log x^3 - \log 3^{\frac{1}{2}}$$
$$= \log 2 + 3\log x - \frac{1}{2}\log 3$$

Yanıt / Answer E

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3. $x = (\sqrt[3]{4})^{\log_2 27}$

$$= 2^{\frac{2}{3}\log_2 27}$$
$$= 2^{\log_2 27^{\frac{2}{3}}}$$
$$= (3^3)^{\frac{2}{3}}$$
$$= 9$$

Yanıt / Answer D

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4. $\log 2 = a\ ,\ \ \log 3 = b\ ,\ \ \log 5 = c$

$$\log\frac{4\sqrt{5}}{27} = \log 4 + \log\sqrt{5} - \log 27$$
$$= 2\log 2 + \frac{1}{2}\log 5 - 3\log 3$$
$$= 2a + \frac{c}{2} - 3b$$

Yanıt / Answer A

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5. $\log 360 = a,$

$\log 2 = b,$

$\log 3 = c$

$$\begin{array}{r|l} 360 & 2 \\ 180 & 2 \\ 90 & 2 \\ 45 & 3 \\ 15 & 3 \\ 5 & 5 \\ 1 & \end{array}$$

$$\log 360 = \log(2^3 \cdot 3^2 \cdot 5)$$
$$= 3\log 2 + 2\log 3 + \log 5$$
$$a = 3b + 2c + \log 5$$
$$\Rightarrow \log 5 = a - 3b - 2c$$

Yanıt / Answer C

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6. $\log_a x = 2 \ \Rightarrow\ \log_x a = \frac{1}{2}$

$\log_b x = 3 \ \Rightarrow\ \log_x b = \frac{1}{3}$

$$\log_{a\cdot b} x = \frac{1}{\log_x (a\cdot b)}$$
$$= \frac{1}{\log_x a + \log_x b}$$
$$= \frac{1}{\frac{1}{2}+\frac{1}{3}} = \frac{6}{5}$$

Yanıt / Answer C

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7. $\log_2 9 = a$

$\log_{25} 3 = b$

$$\log_{25} 3 = b \ \Rightarrow\ 5^{2b} = 3$$
$$\log_2 (5^{2b})^2 = a$$
$$4b(\log_2 5) = a$$
$$\log_2 5 = \frac{a}{4b}$$

Yanıt / Answer C

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8. $\log_2 3 = a\ \ ,\ \ \log_5 2 = b$

$$\log_5 2 = b \ \Rightarrow\ \log_2 5 = \frac{1}{b}$$
$$\log 15 = \frac{\log_2 15}{\log_2 10}$$
$$= \frac{\log_2 3 + \log_2 5}{\log_2 2 + \log_2 5}$$
$$= \frac{a+\frac{1}{b}}{1+\frac{1}{b}} = \frac{ab+1}{b+1}$$

Yanıt / Answer A

9. $\log_5 3 = a \Rightarrow \log_3 5 = \dfrac{1}{a}$

$$\begin{aligned}\log_3 45 &= \log_3 9 + \log_3 5\\ &= 2\log_3 3 + \frac{1}{a}\\ &= 2 + \frac{1}{a}\\ &= \frac{2a+1}{a}\end{aligned}$$

Yanıt / Answer B

10.
$$\begin{aligned}x &= \log_7 16 - \log_7 32\\ &= \log_7\left(\frac{16}{32}\right)\\ &= \log_7 \frac{1}{2}\\ &= -\log_7 2\end{aligned}$$

$x \cdot y = -\log_7 2 \cdot \log_2 7 = -1$

Yanıt / Answer B

11. $\log 3 = a$, $\log 2 = b$

$$\begin{aligned}\log_6 24 &= \frac{\log 24}{\log 6}\\ &= \frac{\log(2^3 \cdot 3)}{\log(2 \cdot 3)}\\ &= \frac{3\log 2 + \log 3}{\log 2 + \log 3}\\ &= \frac{3b+a}{a+b}\end{aligned}$$

Yanıt / Answer D

12. $2 = 3^a \Rightarrow \log_3 2 = a$

$5 = 3^b \Rightarrow \log_3 5 = b$

$$\begin{aligned}\log_3 90 &= \log_3 (2 \cdot 3^2 \cdot 5)\\ &= \log_3 2 + \log_3 3^2 + \log_3 5\\ &= a + b + 2\end{aligned}$$

$$\begin{array}{r|l} 90 & 2\\ 45 & 3\\ 15 & 3\\ 5 & 5\\ 1 & \end{array}$$

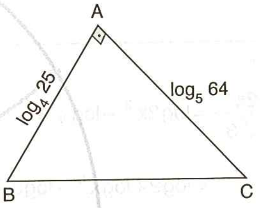
Yanıt / Answer B

13.
$$\begin{aligned}\log_6 72 &= \frac{\log_2 72}{\log_2 6}\\ &= \frac{\log_2(2^3 \cdot 3^2)}{\log_2(2 \cdot 3)}\\ &= \frac{3\log_2 2 + 2\log_2 3}{\log_2 2 + \log_2 3}\\ &= \frac{3+2a}{1+a}\end{aligned}$$

$$\begin{array}{r|l} 72 & 2\\ 36 & 2\\ 18 & 2\\ 9 & 3\\ 3 & 3\\ 1 & \end{array}$$

Yanıt / Answer A

14.
$$\begin{aligned}A(\overset{\Delta}{ABC}) &= \frac{1}{2} \cdot |AB| \cdot |AC|\\ &= \frac{1}{2} \cdot \log_4 25 \cdot \log_5 64\\ &= \frac{1}{2} \cdot \log_4 5^2 \cdot \log_5 4^3\\ &= \frac{1}{2} \cdot 2 \cdot 3 \cdot \log_4 5 \cdot \log_5 4\\ &= 3\ \text{cm}^2\end{aligned}$$



Yanıt / Answer A

15.
$$\begin{aligned}5^{\log_5 x} + 7^{\log_7 (2x-5)} &= \log_2 2^4\\ x^{\log_5 5} + (2x-5)^{\log_7 7} &= 4\log_2 2\\ x + 2x - 5 &= 4\\ 3x - 5 &= 4\\ 3x &= 9\\ x &= 3\end{aligned}$$

Yanıt / Answer C

16.
$$\log_{25} \frac{1}{5} + \log_{\frac{1}{4}} 64 = \log_{5^2} 5^{-1} + \log_{4^{-1}} 4^3$$

$$= \underset{(1)}{\frac{-1}{2}} + \underset{(2)}{\frac{-3}{1}} = -\frac{7}{2}$$

Yanıt / Answer B

1. $f(x) = \log_3 (7x - 5) \Rightarrow \mathbf{f^{-1}(2) = ?}$

A) 1　B) 2　C) 3　D) 4　E) 5

2. $f(x) = 2\log_3\left(\frac{3x-1}{5}\right) + 1 \Rightarrow \mathbf{f^{-1}(1) = ?}$

A) 2　B) 3　C) 4　D) 5　E) 6

3. $f(x) = \log_3 x$,

$f^{-1}(2a - 5) = 27 \Rightarrow \mathbf{a = ?}$

A) 1　B) 2　C) 3　D) 4　E) 5

4. $f(x) = 5^{2x+1} \Rightarrow \mathbf{f^{-1}(25) = ?}$

A) -1　B) $-\frac{1}{2}$　C) $\frac{1}{2}$　D) 1　E) 2

5. $f(x) = \log_3(2x - a)$,

$f^{-1}(2) = 6 \Rightarrow \mathbf{a = ?}$

A) 1　B) 2　C) 3　D) 4　E) 5

6. $f(x) = 2\log_5 x \Rightarrow \mathbf{f^{-1}(1) = ?}$

A) $\frac{1}{25}$　B) $\frac{1}{5}$　C) 5　D) $\sqrt{5}$　E) $\sqrt[3]{5}$

7. $f(x) = e^{-3x+1} \Rightarrow \mathbf{f^{-1}(1) = ?}$

A) $\frac{1}{3}$　B) $\frac{1}{2}$　C) e　D) e^2　E) e^3

8. $f(x) = 7^{x-2} - 49$

$\Rightarrow \mathbf{f^{-1}(294) = ?}$

A) 2　B) 3　C) 4　D) 5　E) 6

9. $f(x)=\log_{\frac{1}{2}}(x-3)\ \Rightarrow \mathbf{f^{-1}(-2)=?}$

A) 5 B) 7 C) 9 D) 11 E) 13

10. $f(x) = \log_3(4x + 7)$

$\Rightarrow \mathbf{f^{-1}(3) = ?}$

A) 19 B) 17 C) 11 D) 7 E) 5

11. $a = \log_2 6,$

$b = \log_3 4$

$c = \log_5 3\ \Rightarrow\ \mathbf{? < ? < ?}$

A) $a < b < c$ B) $c < b < a$ C) $c < a < b$

D) $b < a < c$ E) $a < c < b$

12. $2\log a - \log b = \log c \Rightarrow \mathbf{\dfrac{5a^2+bc}{bc-7a^2}=?}$

A) –2 B) –1 C) $\frac{1}{2}$ D) 1 E) 2

13. $\log_2 x - 6\log_x 2 = 1,\ \text{ÇK(SS)} = \{x_1, x_2\}\ \Rightarrow\ \mathbf{x_1 \cdot x_2 = ?}$

A) –2 B) –1 C) $\frac{1}{2}$ D) 1 E) 2

14. $\log_3 x - 4\cdot\log_x 3 = 0,$

$\text{ÇK(SS)} = \{x_1, x_2\}\ \Rightarrow\ \mathbf{x_1 + x_2 = ?}$

A) $\frac{1}{9}$ B) $\frac{1}{3}$ C) 3 D) 9 E) $\frac{82}{9}$

15. $\log(x + 1) - \log(x - 2) = \log(x - 3),$

$\text{ÇK(SS)} = \{x_1, x_2\}\ \Rightarrow\ \mathbf{x_1 + x_2 = ?}$

A) 5 B) 6 C) 7 D) 8 E) 9

16. $\log_{\sqrt{2}} x - \log_2 x - \log_4 x = \log 0,01\ \Rightarrow\ \mathbf{x = ?}$

A) $\frac{1}{16}$ B) $\frac{1}{8}$ C) $\frac{1}{2}$

D) 4 E) 8

[MARMARA ÜNV. YÖS 2013]

Yanıtlar / Answers

1. B	4. C	7. A	10. E	13. E	16. A
2. A	5. C	8. D	11. B	14. E	
3. D	6. D	9. B	12. B	15. B	

1. $f(x)=\log_3(7x-5)$

$y=\log_3(7x-5)$

$3^y=7x-5$

$x=\frac{3^y+5}{7} \Rightarrow f^{-1}(x)=\frac{3^x+5}{7}$

$f^{-1}(2)=\frac{3^2+5}{7}=2$

Yanıt / Answer B

2. $f(x)=2\log_3\left(\frac{3x-1}{5}\right)+1$

$y=2\log_3\left(\frac{3x-1}{5}\right)+1$

$\frac{y-1}{2}=\log_3\left(\frac{3x-1}{5}\right)$

$3^{\frac{y-1}{2}}=\frac{3x-1}{5}$

$x=\frac{5\cdot 3^{\frac{y-1}{2}}+1}{3}$

$f^{-1}(x)=\frac{5\cdot 3^{\frac{x-1}{2}}+1}{3} \Rightarrow f^{-1}(1)=\frac{5\cdot 3^{\frac{1-1}{2}}+1}{3}=2$

Yanıt / Answer A

3. $f^{-1}(2a-5)=27 \Rightarrow f(27)=2a-5$

$\log_3 27=2a-5$

$3=2a-5$

$8=2a$

$4=a$

Yanıt / Answer D

4. $f(x)=5^{2x+1}$

$y=5^{2x+1}$

$\log_5 y=2x+1$

$x=\frac{\log_5 y-1}{2}$

$f^{-1}(x)=\frac{\log_5 x-1}{2}$

$f^{-1}(25)=\frac{\log_5 25-1}{2}=\frac{2-1}{2}=\frac{1}{2}$

Yanıt / Answer C

5. $f^{-1}(2)=6 \Rightarrow f(6)=2$

$\log_3(2\cdot 6-a)=2$

$12-a=3^2=9$

$a=12-9$

$a=3$

Yanıt / Answer C

6. $f(x)=2\log_5 x \Rightarrow f^{-1}(2\log_5 x)=x$

$2\log_5 x=1$

$\log_5 x=\frac{1}{2}$

$x=5^{\frac{1}{2}}=\sqrt{5}$

Yanıt / Answer D

7. $f(x)=e^{-3x+1}$

$y=e^{-3x+1}$

$\ln y=-3x+1$

$x=\frac{1-\ln y}{3} \Rightarrow f^{-1}(x)=\frac{1-\ln x}{3}$

$f^{-1}(1)=\frac{1-\ln 1}{3}=\frac{1}{3}$

Yanıt / Answer A

8. $f(x)=7^{x-2}-49 \Rightarrow f^{-1}(7^{x-2}-49)=x$

$7^{x-2}-49=294$

$7^{x-2}=343=7^3$

$x-2=3$

$x=5$

Yanıt / Answer D

9. $f(x)=\log_{\frac{1}{2}}(x-3) \Rightarrow f^{-1}(\log_{\frac{1}{2}}(x-3))=x$

$$\log_{\frac{1}{2}}(x-3)=-2$$

$$x-3=\left(\frac{1}{2}\right)^{-2}=4$$

$$x=7$$

Yanıt / Answer B

10. $f(x)=\log_3(4x+7)$

$$y=\log_3(4x+7)$$

$$3^y=4x+7$$

$$x=\frac{3^y-7}{4} \Rightarrow f^{-1}(x)=\frac{3^x-7}{4}$$

$$f^{-1}(3)=\frac{3^3-7}{4}=5$$

Yanıt / Answer E

11. $a=\log_2 6=\log_2 2+\log_2 3=1+\log_2 3 \Rightarrow 2<a<3$

$b=\log_3 4 \Rightarrow 1<b<2$

$c=\log_5 3 \Rightarrow 0<c<1$

$\Rightarrow c<b<a$

Yanıt / Answer B

12. $2\log a-\log b=\log c$

$$\log a^2-\log b=\log c$$

$$\log\frac{a^2}{b}=\log c$$

$$\frac{a^2}{b}=c$$

$$a^2=b\cdot c$$

$$\frac{5a^2+b\cdot c}{b\cdot c-7a^2}=\frac{5a^2+a^2}{a^2-7a^2}=\frac{6a^2}{-6a^2}=-1$$

Yanıt / Answer B

13. $\log_2 x-6\log_x 2=1$

$$\log_2 x-6\frac{1}{\log_2 x}=1$$

$$(\log_2 x)^2-6=\log_2 x$$

$$(\log_2 x)^2-\log_2 x-6=0$$

$$\log_2 x=t \Rightarrow t^2-t-6=0$$

$$(t-3)\cdot(t+2)=0 \Rightarrow t=3\ ,\ t=-2$$

$$\log_2 x=3\ ,\ \log_2 x=-2$$

$$x_1=8\ ,\quad x_2=\frac{1}{4}$$

$$\Rightarrow x_1\cdot x_2=8\cdot\frac{1}{4}=2$$

Yanıt / Answer E

14. $\log_3 x-4\cdot\log_x 3=0$

$$\log_3 x-4\cdot\frac{1}{\log_3 x}=0$$

$$(\log_3 x)^2-4=0$$

$$(\log_3 x-2)\cdot(\log_3 x+2)=0$$

$$\log_3 x=2\ ,\quad \log_3 x=-2$$

$$x_1=9 \qquad x_2=\frac{1}{9}$$

$$\Rightarrow x_1+x_2=9+\frac{1}{9}=\frac{82}{9}$$

Yanıt / Answer E

15. $\log(x+1)-\log(x-2)=\log(x-3)$

$$\log\left(\frac{x+1}{x-2}\right)=\log(x-3)$$

$$\frac{x+1}{x-2}=x-3$$

$$x+1=x^2-5x+6$$

$$x^2-6x+5=0$$

$$x_1+x_2=-\frac{b}{a}=-\frac{-6}{1}=6$$

Yanıt / Answer B

16. $\log_{\sqrt{2}} x-\log_2 x-\log_4 x=\log 0,01$

$$\log_{2^{\frac{1}{2}}} x-\log_2 x-\log_{2^2} x=\log 10^{-2}$$

$$\frac{1}{\frac{1}{2}}\log_2 x-\log_2 x-\frac{1}{2}\log_2 x=-2\cdot\log 10$$

$$\log_2 x\left(2-1-\frac{1}{2}\right)=-2$$

$$(\log_2 x)\cdot\frac{1}{2}=-2$$

$$\log_2 x=-4 \Rightarrow x=2^{-4}=\frac{1}{16}$$

Yanıt / Answer A

1. $\log_{x-3}(x^2-6x+9) = x-5 \Rightarrow$ **x = ?**

A) 3 B) 5 C) 7 D) 9 E) 10

2. $e^{2\ln x} = 16 \Rightarrow$ **x = ?**

A) 1 B) 2 C) 3 D) 4 E) 5

3. $\log_{\frac{1}{27}}\left[\log_{64}(\log_8 x)\right] = \frac{1}{3} \Rightarrow$ **x = ?**

A) 2^4 B) 2^6 C) 2^8 D) 2^{10} E) 2^{12}

4. $\dfrac{\log 250 + \log 9 - 1}{\log 5 + \log 3} = ?$

A) –2 B) –1 C) 1 D) 2 E) 4

5. $\log_2(-x+12) + \log_2(4-x) = 7 \Rightarrow$ **ÇK(SS) = ?**

A) {20} B) {2, 20} C) {–4}

D) {–4, –8} E) {4}

6. $b^{2+\log_b 4x} = 4 \Rightarrow \log_x b = ?$

A) –2 B) –1 C) $-\frac{1}{2}$ D) 1 E) 2

7. $\log_3\left(\frac{x}{y}\right) = 2$ ve(and) $\log_3 x + \log_3 \frac{y}{3} = 3$

$\Rightarrow$ **x + y = ?**

A) 15 B) 18 C) 24 D) 30 E) 36

8. $\log_2(x-2) + \log_2(3x-2) = 6 \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{6, -\frac{10}{3}\right\}$ B) {6, 8} C) {4,3}

D) {6} E) $\left\{\frac{10}{3}\right\}$

9. $3^{\log x} - 2^{\log x - 1} = 2^{\log x + 1} - 2 \cdot 3^{\log x - 1} \Rightarrow$ **x = ?**

A) $\frac{1}{25}$ B) $\frac{1}{5}$ C) 5 D) 10 E) 25

10. $\log x + 1 + \log(x-1) = \log(x^2-1) \Rightarrow$ **ÇK(SS) = ?**

A) $\{1\}$ B) $\left\{\frac{1}{9}\right\}$ C) $\left\{1, \frac{1}{3}\right\}$

D) $\left\{1, \frac{1}{9}\right\}$ E) $\varnothing$

11. $\log_3 x \cdot \log_x y \cdot \log_y \frac{1}{81} = A \Rightarrow$ **A = ?**

A) $-\frac{1}{3}$ B) $-\frac{1}{2}$ C) -2 D) -3 E) -4

12. $\log_9 (x+42) \cdot \log_x 3 = 1 \Rightarrow$ **ÇK(SS) = ?**

A) {–7,6} B) {–6,7} C) {6, 7}

D) {7} E) {6}

13. $2 \cdot 2^{\log_2 (\log_2^2 x)} - 17 \cdot 2^{\log_2 (\log_2 x)} + 8 = 0 \Rightarrow$ **ÇK(SS) = ?**

A) {2, 64} B) $\{\frac{1}{2}, 32\}$ C) $\{\sqrt{2}, 64\}$

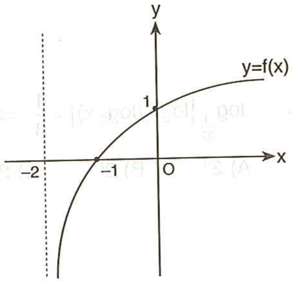
D) $\{2\sqrt{2}, 128\}$ E) $\{\sqrt{2}, 256\}$

14. $\log_a(5a^2) \cdot \log_5^2 a = 3 \Rightarrow$ **ÇK(SS) = ?**

A) {5} B) $\left\{\frac{\sqrt{5}}{2}\right\}$ C) $\left\{\frac{1}{5}, \frac{\sqrt{5}}{5}\right\}$

D) $\left\{\frac{1}{5}, \frac{\sqrt{5}}{25}\right\}$ E) $\left\{5, \frac{\sqrt{5}}{25}\right\}$

15. $\Rightarrow$ **y = ?**



A) $\frac{x}{x+2}$ B) $\log_{\frac{1}{2}}(x-2)$ C) $\log_2(x+2)$

D) $\log_2(x+1)$ E) $\log_{\frac{1}{2}}(x+1)$

Yanıtlar / Answers

1. C	4. D	7. D	10. E	13. E
2. D	5. C	8. D	11. E	14. E
3. E	6. C	9. D	12. D	15. C

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1. $\log_{x-3}(x^2-6x+9) = x-5$

$\log_{x-3}(x-3)^2 = x-5$

$2\log_{x-3}(x-3) = x-5$

$2 = x-5$

$x = 7$

Yanıt / Answer C

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2. $e^{2\ln x} = 16$

$\log_e 16 = 2\ln x$

$\ln 16 = \ln x^2$

$x^2 = 16 \Rightarrow x = 4$

Yanıt / Answer D

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3. $\log_{\frac{1}{27}}\left[\log_{64}(\log_8 x)\right] = \frac{1}{3}$

$\log_{64}(\log_8 x) = (3^{-3})^{\frac{1}{3}}$

$\log_{64}(\log_8 x) = \frac{1}{3}$

$\log_8 x = (4^3)^{\frac{1}{3}}$

$\log_8 x = 4$

$x = 8^4$

$x = 2^{12}$

Yanıt / Answer E

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4. $\dfrac{\log 250 + \log 9 - 1}{\log 5 + \log 3} = \dfrac{\log 250 + \log 9 - \log 10}{\log 5 + \log 3}$

$= \dfrac{\log\left(\dfrac{250 \cdot 9}{10}\right)}{\log(5 \cdot 3)}$

$= \dfrac{\log 225}{\log 15}$

$= \dfrac{2\log 15}{\log 15} = 2$

Yanıt / Answer D

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5. $\log_2(-x+12) + \log_2(4-x) = 7$

$\log_2[(-x+12)\cdot(4-x)] = 7$

$(12-x)\cdot(4-x) = 128$

$x^2 - 16x + 48 = 128$

$x^2 - 16x - 80 = 0$

$\downarrow \qquad \downarrow$

$x \qquad -20$

$x \qquad 4$

$(x-20)\cdot(x+4) = 0$

$x = 20, \; x = -4$

ÇK(SS) $= \{-4\}$

Yanıt / Answer C

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6. $b^{2+\log_b 4x} = 4$

$\log_b 4 = 2 + \log_b 4x$

$\log_b 4 - \log_b 4x = 2$

$\log_b\left(\dfrac{4}{4x}\right) = 2$

$\log_b x^{-1} = 2$

$\log_b x = -2 \Rightarrow \log_x b = -\dfrac{1}{2}$

Yanıt / Answer C

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7. $\log_3\left(\dfrac{x}{y}\right) = 2 \Rightarrow \log_3 x - \log_3 y = 2$

$\log_3 x + \log_3 \dfrac{y}{3} = 3 \Rightarrow + \underline{\log_3 x + \log_3 y - \log_3 3 = 3}$

$2\log_3 x - 1 = 5$

$2\log_3 x = 6$

$\log_3 x = 3$

$x = 27$

$\log_3 x - \log_3 y = 2$

$3 - \log_3 y = 2$

$\log_3 y = 1 \Rightarrow y = 3$

$\Rightarrow x + y = 27 + 3 = 30$

Yanıt / Answer D

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8. $\log_2(x-2) + \log_2(3x-2) = 6$

$\log_2[(x-2)\cdot(3x-2)] = 6$

$(x-2)\cdot(3x-2) = 64$

$3x^2 - 8x + 4 = 64$

$3x^2 - 8x - 60 = 0$

$(3x+10)(x-6) = 0$

$x = 6 \qquad x = -\dfrac{10}{3} < 2$

Yanıt / Answer D

9. $3^{\log x} - 2^{\log x-1} = 2^{\log x+1} - 2\cdot 3^{\log x-1}$

$$3^{\log x} + \frac{2}{3}\cdot 3^{\log x} = 2\cdot 2^{\log x} + \frac{1}{2}\cdot 2^{\log x}$$

$$\frac{5}{3}\cdot 3^{\log x} = \frac{5}{2}\cdot 2^{\log x}$$

$$3^{\log x-1} = 2^{\log x-1}$$

$$\log x - 1 = 0$$

$$\log x = 1 \Rightarrow x = 10$$

Yanıt / Answer D

10. $\log x + 1 + \log(x-1) = \log(x^2-1)$

$$\log(x^2-1) - \log(x) - \log(x-1) = 1$$

$$\log\left(\frac{x^2-1}{x(x-1)}\right) = 1$$

$$\frac{(x-1)\cdot(x+1)}{x(x-1)} = 10$$

$$\frac{x+1}{x} = 10$$

$$x+1 = 10x \Rightarrow x = \frac{1}{9}$$

$$x-1 = \frac{1}{9} - 1 = -\frac{8}{9} < 0 \Rightarrow \text{ÇK(SS)} = \varnothing$$

Yanıt / Answer E

11. $\log_3 x \cdot \log_x y \cdot \log_y \frac{1}{81} = A$

$$\log_3 x \cdot \log_x 3^{-4} = A$$

$$\log_3 3^{-4} = A$$

$$A = -4$$

Yanıt / Answer E

12. $\log_9(x+42)\cdot \log_x 3 = 1$

$$\log_x 3 \cdot \log_{3^2}(x+42) = 1$$

$$\frac{1}{2}\log_x 3 \cdot \log_3(x+42) = 1$$

$$\log_x(x+42) = 2$$

$$x^2 = x+42$$

$$x^2 - x - 42 = 0$$

$$(x-7)(x+6) = 0$$

$$x = 7,\ x = -6$$

$$x > 0 \Rightarrow x = 7$$

Yanıt / Answer D

13. $2\cdot 2^{\log_2(\log_2^2 x)} - 17\cdot 2^{\log_2(\log_2 x)} + 8 = 0$

$$2\cdot \log_2^2 x - 17\cdot \log_2 x + 8 = 0$$

$$t = \log_2 x \Rightarrow$$

$$2t^2 - 17t + 8 = 0$$

$\downarrow \qquad \downarrow$

$2t \qquad -1$

$t \qquad -8$

$$t = \frac{1}{2}, \quad t = 8$$

$$\log_2 x = \frac{1}{2} \qquad \log_2 x = 8$$

$$x = \sqrt{2} \qquad x = 2^8 = 256$$

$$\text{ÇK(SS)} = (\sqrt{2}, 256)$$

Yanıt / Answer E

14. $\log_a 5a^2 \cdot \log_5^2 a = 3$

$$(\log_a 5 + \log_a a^2)\cdot(\log_5 a)^2 = 3$$

$$(\log_a 5 + 2)\cdot(\log_5 a)^2 = 3$$

$$\log_5 a = t$$

$$(\frac{1}{t} + 2)\cdot t^2 = 3$$

$$(1+2t)\cdot t = 3$$

$$2t^2 + t - 3 = 0$$

$$t = 1 \ ,\ t = -\frac{3}{2}$$

$$\log_5 a = 1 \Rightarrow a = 5$$

$$\log_5 a = -\frac{3}{2} \Rightarrow 5^{-\frac{3}{2}} = a = \frac{\sqrt{5}}{25}$$

$$\text{ÇK(SS)} = (5, \frac{\sqrt{5}}{25})$$

Yanıt / Answer E

15. $y = f(x)$

$f(-1) = 0$ ve (and) $\log_a 1 = 0 \Rightarrow y = \log_a(x+2)$

$f(0) = 1$ ve (and) $\log_a a = 1 \Rightarrow y = \log_2(x+2)$

$\Rightarrow y = \log_2(x+2)$

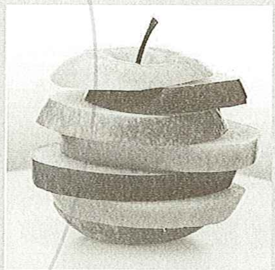
Yanıt / Answer C

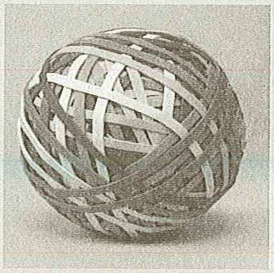
ÜNİTE 8
UNIT

Banach Stefan [1892 – 1945]

Leh matematikçi. Fonsiyonel analiz konusuna katkıları olan ilk kişilerdendir.

Polish mathematician who was a major contributor to the subject known as functional analysis.





✓ **TÜMEVARIM, DİZİLER ve SERİLER** .... **333 – 352**
✓ **PERMÜTASYON, KOMBİNASYON, BİNOM AÇILIMI** .... **353 – 360**
✓ **MATRİS ve DETERMİNANT** .... **361 – 376**
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✓ INDUCTION, SEQUENCES and SERIES .... 333 – 352
✓ PERMUTATION, COMBINATION, BINOMIAL EXPANSION .... 353 – 360
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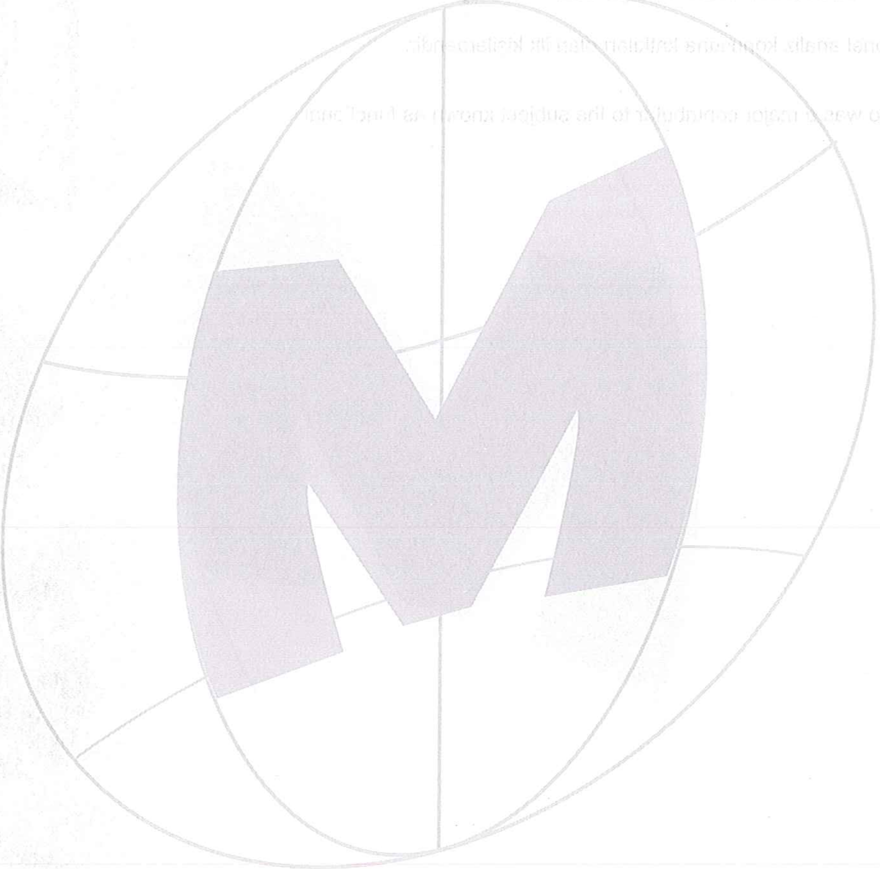

TÜMEVARIM, DİZİLER ve SERİLER
INDUCTION, SEQUENCES and SERIES

BÖLÜM
CHAPTER
1

Toplam Sembolü / Summation Symbol

Test 1

1. $\sum_{k=1}^{8}(2k-3)=?$

A) 16 B) 24 C) 32 D) 48 E) 52

2. $\sum_{k=1}^{2}(2k+1)=?$

A) 4 B) 6 C) 8 D) 10 E) 12

3. $\sum_{k=1}^{5}(2k^2-k)=?$

A) 85 B) 90 C) 95 D) 100 E) 110

4. $\sum_{k=0}^{7}(3k-1)=?$

A) 66 B) 68 C) 70 D) 72 E) 76

5. $\sum_{k=1}^{n}(k-2)=65 \Rightarrow n=?$

A) 10 B) 12 C) 13 D) 15 E) 18

6. $\sum_{k=7}^{16}(k-6)^2=?$

A) 365 B) 375 C) 385 D) 395 E) 405

7. $\sum_{k=1}^{10}k^2-5=?$

A) 380 B) 385 C) 390 D) 395 E) 400

8. $\sum_{k=1}^{15}(m+k)=165 \Rightarrow m=?$

A) 2 B) 3 C) 4 D) 5 E) 6

9. $\sum\limits_{k=-1}^{4} k^2 = ?$

A) 30 B) 31 C) 32 D) $\frac{63}{2}$ E) $\frac{65}{2}$

10. $\sum\limits_{k=-2}^{n} (2k-1) = 16 \Rightarrow n = ?$

A) 3 B) 4 C) 5 D) 6 E) 7

11. $\sum\limits_{m=1}^{6} \sum\limits_{n=1}^{4} (m \cdot n) = ?$

A) 180 B) 190 C) 200 D) 208 E) 210

12. $\sum\limits_{k=-2}^{10} (k^2 + 6k + 9) = ?$

A) 819 B) 822 C) 834 D) 852 E) 869

13. $\sum\limits_{m=2}^{5} \sum\limits_{n=-2}^{2} 4 = ?$

A) 48 B) 50 C) 55 D) 60 E) 80

14. $\sum\limits_{k=1}^{4} \sum\limits_{m=-1}^{2} (2mk + m) = ?$

A) 48 B) 50 C) 56 D) 60 E) 64

15. $\sum\limits_{k=-1}^{3} k^{k+1} = ?$

A) 86 B) 88 C) 90 D) 91 E) 92

16. $\sum\limits_{k=1}^{6} (2k + p) = 66 \Rightarrow p = ?$

A) –2 B) 0 C) 2 D) 4 E) 6

[AKDENİZ ÜNV. YÖS 2013]

Yanıtlar / Answers

1. D	4. E	7. A	10. C	13. E	16. D
2. C	5. C	8. B	11. E	14. A	
3. C	6. C	9. B	12. A	15. D	

1. $\sum_{k=1}^{8}(2k-3)=2\cdot\frac{8\cdot 9}{2}-3\cdot 8=72-24=48$

Yanıt / Answer D

2. $\sum_{k=1}^{2}(2k+1)=2\cdot\frac{2\cdot 3}{2}+2\cdot 1=6+2=8$

Yanıt / Answer C

3. $\sum_{k=1}^{5}(2k^2-k)=2\sum_{k=1}^{5}k^2-\sum_{k=1}^{5}k$

$=2\cdot\frac{5\cdot 6\cdot 11}{6}-\frac{5\cdot 6}{2}$

$=110-15$

$=95$

Yanıt / Answer C

4. $\sum_{k=0}^{7}(3k-1)=3\cdot\frac{7\cdot 8}{2}-8$

$=84-8$

$=76$

Yanıt / Answer E

5. $\sum_{k=1}^{n}(k-2)=65$

$\frac{n(n+1)}{2}-2n=65$

$n^2+n-4n=130$

$n^2-3n=130$

$n(n-3)=13\cdot 10$

$n=13$

Yanıt / Answer C

6. $\sum_{k=7}^{16}(k-6)^2=\sum_{k=7-6}^{16-6}(k+6-6)^2$

$=\sum_{k=1}^{10}k^2=\frac{10\cdot 11\cdot 21}{6}=385$

Yanıt / Answer C

7. $\sum_{k=1}^{10}k^2-5=\frac{10\cdot 11\cdot 21}{6}-5$

$=385-5$

$=380$

Yanıt / Answer A

8. $\sum_{k=1}^{15}(m+k)=165$

$15m+\frac{15\cdot 16}{2}=165$

$15m+120=165$

$15m=45$

$m=3$

Yanıt / Answer B

9. $\sum\limits_{k=-1}^{4} k^2 = \sum\limits_{k=-1+2}^{4+2} (k-2)^2$

$= \sum\limits_{k=1}^{6} (k^2 - 4k + 4)$

$= \dfrac{6\cdot 7\cdot 13}{6} - 4\cdot\dfrac{6\cdot 7}{2} + 6\cdot 4$

$= 91 - 84 + 24 = 7 + 24 = 31$

Yanıt / Answer B

---

10. $\sum\limits_{k=-2}^{n} (2k-1) = 16$

$\sum\limits_{k=-2+3}^{n+3} (2(k-3)-1) = 16$

$\sum\limits_{k=1}^{n+3} (2k-7) = 16$

$\dfrac{2(n+3)(n+4)}{2} - 7(n+3) = 16$

$(n+3)\cdot(n+4-7) = 16$

$n^2 - 9 = 16 \Rightarrow n^2 = 25 \Rightarrow n = 5$

Yanıt / Answer C

---

11. $\sum\limits_{m=1}^{6} \sum\limits_{n=1}^{4} (m\cdot n) = \sum\limits_{m=1}^{6} m\dfrac{4\cdot 5}{2}$

$= \sum\limits_{m=1}^{6} 10n = 10\cdot\dfrac{6\cdot 7}{2} = 210$

Yanıt / Answer E

---

12. $\sum\limits_{k=-2}^{10} (k^2 + 6k + 9) = \sum\limits_{k=-2+3}^{10+3} (k-3+3)^2$

$= \sum\limits_{k=1}^{13} k^2 = \dfrac{13\cdot 14\cdot 27}{6} = 819$

Yanıt / Answer A

---

13. $\sum\limits_{m=2}^{5} \sum\limits_{n=-2}^{2} 4 = \sum\limits_{m=2}^{5} 4\cdot(2+2+1)$

$= \sum\limits_{m=2}^{5} 20 = 20\cdot(5-2+1) = 20\cdot 4 = 80$

Yanıt / Answer E

---

14. $\sum\limits_{k=1}^{4} \sum\limits_{m=-1}^{2} (2mk + m)$

$= \sum\limits_{k=1}^{4} \left(-2k - 1 + 0 + 2k + 1 + 4k + 2\right]$

$= \sum\limits_{k=1}^{4} (4k+2) = 4\cdot\dfrac{4\cdot 5}{2} + 2\cdot 4$

$= 40 + 8 = 48$

Yanıt / Answer A

---

15. $\sum\limits_{k=-1}^{3} k^{k+1} = (-1)^{-1+1} + 0^{0+1} + 1^{1+1} + 2^{2+1} + 3^{3+1}$

$= 1 + 1 + 8 + 81$

$= 91$

Yanıt / Answer D

---

16. $\sum\limits_{k=1}^{6} (2k + p) = 66 \Rightarrow \dfrac{2\cdot 6\cdot 7}{2} + 6p = 66$

$6p = 66 - 42$

$6p = 24$

$p = 4$

Yanıt / Answer D

L

1. $\prod_{k=1}^{12} (k^2 - k - 12) = ?$

A) 0 B) 1 C) 6 D) 12! E) 11!·12!

2. $\prod_{k=1}^{15} \left(1 + \frac{1}{k}\right) = ?$

A) $\frac{1}{16}$ B) $\frac{1}{15}$ C) 1 D) 15 E) 16

3. $\prod_{k=3}^{17} k(k-7) = ?$

A) –18 B) –12 C) 0 D) 12 E) 18

4. $\prod_{k=1}^{5} \left(2 + \frac{2}{k}\right) = ?$

A) 12 B) 24 C) 72 D) 144 E) 192

5. $\prod_{k=1}^{n} \left(\frac{1}{2}\right)^k = 2^{-10} \Rightarrow n = ?$

A) 3 B) 4 C) 5 D) 6 E) 8

6. $\prod_{k=1}^{4} \log \sqrt[k]{100} = ?$

A) $\frac{1}{3}$ B) $\frac{2}{3}$ C) $\frac{3}{4}$ D) $\frac{3}{2}$ E) $\frac{4}{3}$

7. $\prod_{k=1}^{13} 5^{\log_5\left(\frac{k+1}{k}\right)} = ?$

A) 13 B) 14 C) 15 D) 18 E) 25

8. $\prod_{k=1}^{n} 3^{\frac{k}{5}} = 9 \Rightarrow n = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

9. $\prod\limits_{k=2}^{31} \log_k(k+1) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

10. $\prod\limits_{k=1}^{16} \sin(\frac{k\pi}{4}) = ?$

A) $-\frac{\sqrt{2}}{2}$ B) -1 C) 0 D) 1 E) $\frac{\sqrt{2}}{2}$

11. $\prod\limits_{k=0}^{4} (3^k - k!) = ?$

A) 0 B) 4 C) 8 D) 16 E) 32

12. $\prod\limits_{k=1}^{16} 2^{k-8} = ?$

A) 64 B) 128 C) 256 D) 512 E) 1024

13. $\prod\limits_{m=1}^{3} \sum\limits_{n=1}^{4} \frac{3}{m} = ?$

A) 72 B) 144 C) 216 D) 288 E) 360

14. $\prod\limits_{k=3}^{9} 5(k-2) = ?$

A) $5^7 \cdot 7!$ B) $5^6 \cdot 6!$ C) $5 \cdot 7!$

D) $5 \cdot 6!$ E) $45 \cdot 6!$

15. $\prod\limits_{k=5}^{49} (1 - \frac{14}{k}) = ?$

A) –7 B) –2 C) 0 D) 2 E) 7

16. $\prod\limits_{k=2}^{31} \log_k(k+1) = ?$

A) 3 B) 4 C) 11

D) 7 E) 5

[YTÜ. YÖS 2012]

Yanıtlar / Answers					
1. A	4. E	7. B	10. C	13. D	16. E
2. E	5. B	8. C	11. A	14. A	
3. C	6. B	9. E	12. C	15. C	

1. $\prod_{k=1}^{12}(k^2-k-12)$

$=(1-1-12)\cdot\ldots\ldots\cdot\underbrace{(16-4-12)}_{0}\cdot\ldots\ldots$

$=0$

Yanıt / Answer A

2. $\prod_{k=1}^{15}\left(1+\frac{1}{k}\right)=\frac{2}{1}\cdot\frac{3}{2}\cdot\frac{4}{3}\cdot\ldots\cdot\frac{16}{15}=16$

Yanıt / Answer E

3. $\prod_{k=3}^{17}k(k-7)=3\cdot(3-7)\ldots\ldots7\underbrace{(7-7)}_{0}\ldots\ldots=0$

Yanıt / Answer C

4. $\prod_{k=1}^{5}\left(2+\frac{2}{k}\right)=2^5\cdot\left(\frac{2}{1}\cdot\frac{3}{2}\cdot\frac{4}{3}\cdot\frac{6}{5}\right)$

$=32\cdot6=192$

Yanıt / Answer E

5. $\prod_{k=1}^{n}\left(\frac{1}{2}\right)^k=2^{-10}$

$\left(\frac{1}{2}\right)^{\frac{n(n+1)}{2}}=2^{-10}$

$-\frac{n(n+1)}{2}=-10$

$n\cdot(n+1)=20$

$\underset{\uparrow}{n}\cdot(n+1)=\underset{\uparrow}{4}\cdot5$

$n=4$

Yanıt / Answer B

6. $\prod_{k=1}^{4}\log\sqrt[k]{100}=\prod_{k=1}^{4}\frac{1}{k}\cdot\underbrace{\log100}_{2}$

$=\prod_{k=1}^{4}\frac{2}{k}=\frac{2}{1}\cdot\frac{2}{2}\cdot\frac{2}{3}\cdot\frac{2}{4}=\frac{2}{3}$

Yanıt / Answer B

7. $\prod_{k=1}^{13}5^{\log_5\left(\frac{k+1}{k}\right)}=\prod_{k=1}^{13}\left(\frac{k+1}{k}\right)$

$=\frac{2}{1}\cdot\frac{3}{2}\cdot\frac{4}{3}\cdot\ldots\ldots\cdot\frac{14}{13}$

$=14$

Yanıt / Answer B

8. $\prod_{k=1}^{n}3^{\frac{k}{5}}=9$

$3^{\frac{1}{5}\cdot\frac{n(n+1)}{2}}=3^2$

$\frac{n(n+1)}{10}=2$

$n(n+1)=20$

$n=4$

Yanıt / Answer C

9. $\prod_{k=2}^{31}\log_k(k+1) = \log_2 3\cdot\log_3 4\cdot\log_4 5\cdot\ldots\cdot\log_{31}32$

$= \log_2 32$

$= 5$

Yanıt / Answer E

---

10. $\prod_{k=1}^{16}\sin(\frac{k\pi}{4}) = \sin\frac{\pi}{4}\cdot\sin\frac{\pi}{2}\cdot\sin\frac{3\pi}{4}\cdot\underbrace{\sin\pi}_{0}\ldots\ldots$

$= 0$

Yanıt / Answer C

---

11. $\prod_{k=0}^{4}(3^k - k!) = \left(\underbrace{3^0 - 0!}_{0}\right)\cdot(3^1 - 1!)\ldots\ldots\cdot(3^4 - 4!)$

$= 0$

Yanıt / Answer A

---

12. $\prod_{k=1}^{16}2^{k-8} = 2^{\frac{16\cdot17}{2}-16\cdot8}$

$= 2^{8\cdot17-16\cdot8} = 2^8 = 256$

Yanıt / Answer C

---

13. $\prod_{m=1}^{3}\sum_{n=1}^{4}\frac{3}{m} = \prod_{m=1}^{3}\left(\frac{12}{m}\right)$

$= \frac{12}{1}\cdot\frac{12}{2}\cdot\frac{12}{3}$

$= 12\cdot6\cdot4 = 288$

Yanıt / Answer D

---

14. $\prod_{k=3}^{9}5(k-2) = 5^{9-3+1}\cdot\prod_{k=3}^{9}(k-2)$

$= 5^7\,(\underbrace{(1)\,(2)\cdots(7)}_{7!})$

$= 5^7\cdot7!$

Yanıt / Answer A

---

15. $\prod_{k=5}^{49}(1-\frac{14}{k}) = \left(1-\frac{14}{5}\right)\cdot\left(1-\frac{14}{6}\right)\cdot\cdots\cdot\underbrace{(1-\frac{14}{14})}_{0}\cdot\cdots$

$= 0$

Yanıt / Answer C

---

16. $\prod_{k=2}^{31}\log_k(k+1) = \log_2 3\cdot\log_3 4\cdot\ldots\cdot\log_{31}32$

$= \log_2 32 = 5$

Yanıt / Anwers E

1. $\sum_{k=1}^{n} k = \frac{13+13n}{2} \Rightarrow n = ?$

A) 10 B) 13 C) 16 D) 20 E) 26

2. $i^2 = -1$

$\Rightarrow \sum_{k=3}^{41} i^k = ?$

A) –i B) –1 C) 0 D) 1 E) i

3. $\sum_{k=1}^{63} \log_x (k+1) - \sum_{k=1}^{63} \log_x k = 3 \Rightarrow x = ?$

A) 2 B) 3 C) 4 D) 6 E) 8

4. $\sum_{k=1}^{23} \left(\frac{3}{k} - \frac{3}{k+1} \right) = ?$

A) $\frac{23}{8}$ B) $\frac{25}{8}$ C) $\frac{41}{12}$ D) $\frac{43}{12}$ E) $\frac{67}{24}$

5. $\sum_{k=1}^{x+2} (2k-3) = 48 \Rightarrow x = ?$

A) 4 B) 6 C) 8 D) 10 E) 12

6. $\sum_{k=-1}^{7} (2k+1) = ?$

A) 60 B) 61 C) 62 D) 63 E) 64

7. $\sum_{k=1}^{4} (k+5)^2 - \sum_{k=1}^{4} (10k+25) = ?$

A) 25 B) 30 C) 35 D) 36 E) 40

8. $f(x) = 3x - 1, \ \sum_{k=1}^{8} [f(k)]^2 = ?$

A) 1628 B) 1656 C) 1704 D) 1824 E) 1972

9. f, g: N → N

$$f(x)=\sum_{k=1}^{x}k^{2},\quad g(x)=\sum_{k=1}^{x}k^{3}\Rightarrow (fog)(2)=?$$

A) 285 B) 290 C) 300 D) 305 E) 310

10. f, g: Z → Z

f(x) = 2x − 3, g(x) = 3x + 1

$$\Rightarrow \sum_{k=1}^{6}(fog)(k)=?$$

A) 118 B) 120 C) 126 D) 132 E) 138

11. $\prod_{k=1}^{n}k^{\frac{1}{2}}=12\sqrt{5}\Rightarrow n=?$

A) 3 B) 4 C) 5 D) 6 E) 7

12. $\prod_{k=20}^{21}\sum_{m=1}^{3}(m^{2}-1)=?$

A) 11 B) 64 C) 99 D) 121 E) 144

13. $\sum_{k=1}^{5}\prod_{m=1}^{3}\frac{m+1}{m}=?$

A) 20 B) 40 C) 60 D) 80 E) 120

14. $\prod_{n=1}^{2}\sum_{m=1}^{3}(n^{2}-m+n\cdot m)=?$

A) 15 B) 16 C) 18 D) 21 E) 54

15. $\sum_{k=1}^{6}\prod_{m=-1}^{1}(k+m)=?$

A) 121 B) 180 C) 320 D) 420 E) 441

16. $|x|<1\Rightarrow\sum_{n=1}^{\infty}x^{n}=?$

A) $\frac{1}{1-x}$ B) $\frac{1}{1+x}$ C) $\frac{x}{1-x}$

D) 1 E) 10

[İSTANBUL ÜNV. YÖS 2013]

Yanıtlar / Answers

1. B	4. A	7. B	10. B	13. A	16. C
2. D	5. B	8. A	11. D	14. E	
3. C	6. D	9. A	12. D	15. D	

1. $\sum\limits_{k=1}^{n} k = \dfrac{13+13n}{2}$

$\dfrac{n(n+1)}{2} = \dfrac{13(n+1)}{2} \Rightarrow n=13$

Yanıt / Answer B

---

2. $\sum\limits_{k=3}^{41} i^{k} = \dfrac{i^{42}-i^{3}}{i-1}$

$= \dfrac{i^{2}-(-i)}{i-1} = \dfrac{-1+i}{i-1} = 1$

Yanıt / Answer D

---

3. $\sum\limits_{k=1}^{63} \log_x (k+1) - \sum\limits_{k=1}^{63} \log_x k = 3$

$\sum\limits_{k=1}^{63} \left(\log_x (k+1) - \log_x k\right) = 3$

$\sum\limits_{k=1}^{63} \log_x \dfrac{(k+1)}{k} = 3$

$\log_x \left(\dfrac{2}{1}\cdot\dfrac{3}{2}\cdot\dfrac{4}{3}\cdot \ldots\ldots \dfrac{64}{63}\right) = 3$

$\log_x 64 = 3$

$x^3 = 64$

$x^3 = 4^3$

$x = 4$

Yanıt / Answer C

---

4. $a_k = \dfrac{3}{k} - \dfrac{3}{k+1}$

$k=1 \rightarrow a_1 = \dfrac{3}{1} - \dfrac{3}{2}$

$k=2 \rightarrow a_2 = \dfrac{3}{2} - \dfrac{3}{3}$

$k=3 \rightarrow a_3 = \dfrac{3}{3} - \dfrac{3}{4}$

$k=4 \rightarrow a_4 = \dfrac{3}{4} - \dfrac{3}{5}$

$\vdots \qquad \vdots \qquad \vdots$

$k=23 \rightarrow a_{23} = \dfrac{3}{23} - \dfrac{3}{24}$

$+$

$\sum\limits_{k=1}^{23} a_k = 3 - \dfrac{3}{24} = 3 - \dfrac{1}{8} = \dfrac{23}{8}$

Yanıt / Answer A

---

5. $\sum\limits_{k=1}^{x+2} (2k-3) = 48$

$2\cdot \dfrac{(x+2)\cdot(x+3)}{2} - 3(x+2) = 48$

$(x+2)\cdot x = 8\cdot 6$

$x = 6$

Yanıt / Answer B

---

6. $\sum\limits_{k=-1}^{7} (2k+1) = \sum\limits_{k=-1+2}^{7+2} (2(k-2)+1)$

$= \sum\limits_{k=1}^{9} (2k-3)$

$= 2\cdot\dfrac{9\cdot 10}{2} - 3\cdot 9$

$= 90 - 27 = 63$

Yanıt / Answer D

---

7. $\sum\limits_{k=1}^{4} (k+5)^2 - \sum\limits_{k=1}^{4} (10k+25)$

$= \sum\limits_{k=1}^{4} (k^2 + 10k + 25 - 10k - 25)$

$= \sum\limits_{k=1}^{4} k^2 = \dfrac{4\cdot 5\cdot 9}{6} = 30$

Yanıt / Answer B

---

8. $f(x) = 3x-1 \Rightarrow f(k) = 3k-1$

$\sum\limits_{k=1}^{8} (f(k))^2 = \sum\limits_{k=1}^{8} (3k-1)^2 = \sum\limits_{k=1}^{8} (9k^2 - 6k + 1)$

$= 9\cdot\dfrac{8\cdot 9\cdot 17}{6} - 6\cdot\dfrac{8\cdot 9}{2} + 8$

$= 836 - 216 + 8 = 1628$

Yanıt / Answer A

9. $g(2)=\sum_{k=1}^{2}k^3=1^3+2^3=9$

$f[g(2)]=f(9)=\sum_{k=1}^{9}k^2=\frac{9\cdot10\cdot19}{6}=285$

Yanıt / Answer A

---

10. $\left.\begin{array}{l}f(x)=2x-3\\ g(x)=3x+1\end{array}\right\}\Rightarrow\left\{\begin{array}{l}(fog)(x)=2(3x+1)-3\\ \quad=6x+2-3\\ \quad=6x-1\end{array}\right.$

$\sum_{k=1}^{6}(fog)(k)=\sum_{k=1}^{6}(6k-1)=6\cdot\frac{6\cdot7}{2}-6$

$=126-6=120$

Yanıt / Answer B

---

11. $\prod_{k=1}^{n}k^{\frac{1}{2}}=12\sqrt{5}$

$\sqrt{\prod_{k=1}^{n}k}=\sqrt{5\cdot144}$

$\sqrt{\prod_{k=1}^{n}k}=\sqrt{1\cdot2\cdot3\cdot4\cdot5\cdot6}$

$n!=6!\Rightarrow n=6$

Yanıt / Answer D

---

12. $\prod_{k=20}^{21}\sum_{m=1}^{3}(m^2-1)=\prod_{k=20}^{21}\left(\frac{3\cdot4\cdot7}{6}-3\right)$

$=\prod_{k=20}^{21}(14-3)=\prod_{k=20}^{21}11$

$=11^{21-20+1}=11^2=121$

Yanıt / Answer D

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13. $\sum_{k=1}^{5}\prod_{m=1}^{3}\frac{m+1}{m}=\sum_{k=1}^{5}\left(\frac{2}{1}\cdot\frac{3}{2}\cdot\frac{4}{3}\right)$

$=\sum_{k=1}^{5}4=4\cdot5=20$

Yanıt / Answer A

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14. $\prod_{n=1}^{2}\sum_{m=1}^{3}(n^2-m+n\cdot m)=\prod_{n=1}^{2}\left(3n^2-\frac{3\cdot4}{2}+n\cdot\frac{3\cdot4}{2}\right)$

$=\prod_{n=1}^{2}\left(3n^2+6n-6\right)$

$=(3+6-6)\cdot(12+12-6)$

$=3\cdot(18)=54$

Yanıt / Answer E

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15. $\sum_{k=1}^{6}\prod_{m=-1}^{1}(k+m)=\sum_{k=1}^{6}[(k-1)\cdot(k)\cdot(k+1)]$

$=\sum_{k=1}^{6}(k^3-k)=\left[\frac{6\cdot7}{2}\right]^2-\frac{6\cdot7}{2}$

$=21^2-21=21(21-1)$

$=21\cdot20=420$

Yanıt / Answer D

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16. $\sum_{n=1}^{\infty}x^n=\frac{a_1}{1-r}=\frac{x}{1-x}$

Yanıt / Answer C

1. $a_n = 5n + 5 \Rightarrow \mathbf{a_3 = ?}$

A) 8 B) 12 C) 15 D) 18 E) 20

2. $a_n = 4n^2 + 3n$

$b_n = 3n + 8$

$\Rightarrow \mathbf{a_3 + b_2 = ?}$

A) 53 B) 55 C) 57 D) 59 E) 61

3. $a_n = kn^2 + bn + c,$

$b_n = 3n^2 + 4n + 5,$

$(a_n) = (b_n)$

$\Rightarrow \mathbf{k + b + c = ?}$

A) 2 B) 10 C) 12 D) 14 E) 15

4. $a_{n+1} = 3n^2 - 5n + 14$

$\Rightarrow \mathbf{a_3 = ?}$

A) 10 B) 12 C) 13 D) 14 E) 16

5. $a_{n-5} = 4n + 5 \Rightarrow \mathbf{a_n = ?}$

A) 2n B) 4n C) 4n + 5 D) 4n + 25 E) 8n + 10

6. $a_n = \dfrac{3^{n+1}}{n} \Rightarrow \mathbf{a_{n+1} = ?}$

A) $\dfrac{3^n}{n}$ B) $\dfrac{3^{n+2}}{n}$ C) $\dfrac{3^{n+2}}{n+1}$ D) $\dfrac{3^n}{2n}$ E) $\dfrac{3^n}{n+1}$

7. $\left.\begin{array}{l} a_{n-5} = 3^{n+1}\cdot n \\ b_{n+1} = \dfrac{4n^2 - 5n}{2} \end{array}\right\} \Rightarrow \mathbf{a_6 \cdot b_3 = ?}$

A) $11\cdot 3^{13}$ B) 3^{13} C) $3^{12}\cdot 11$ D) 3^{12} E) $11\cdot 3^{11}$

8. $\left.\begin{array}{l} \dfrac{a_{n+1} + a_{n-1}}{2} = a_n \\ a_{12} = 14,\ a_{16} = 16 \end{array}\right\} \Rightarrow \mathbf{a_{14} = ?}$

A) 12 B) 13 C) 14 D) 15 E) 16

9. $\left.\begin{array}{l} a_{n+1} = \dfrac{3^{n+2}}{(n+1)!} \\ \dfrac{a_n}{a_{n-1}} = \dfrac{1}{2} \end{array}\right\} \Rightarrow \mathbf{n = ?}$

A) 2
B) 4
C) 6
D) 7
E) 8

10. $a_n = \begin{cases} 3n-1, & n \equiv 0 \pmod 3 \\ 2n+4, & n \equiv 1 \pmod 3 \\ 2n-2, & n \equiv 2 \pmod 3 \end{cases} \Rightarrow \mathbf{a_4 + a_3 - a_5 = ?}$

A) 6
B) 8
C) 10
D) 12
E) 14

11. $a_n \in Z$,

$a_n = \dfrac{n^2-n-6}{n^2-4} \Rightarrow \mathbf{n = ?}$

A) 1
B) 2
C) 3
D) 4
E) 5

12. $a_{n+1} = 5n^2 - n^3$,

$b_{n+1} = 4n - 4$,

$c_n + 3 = 5n$

$\Rightarrow \mathbf{a_5 - b_3 + c_2 = ?}$

A) 13
B) 14
C) 15
D) 16
E) 19

13. $a_n = 3 + a_{n-1}$,

$a_5 = 4 \Rightarrow \mathbf{a_{12} = ?}$

A) 13
B) 15
C) 20
D) 25
E) 27

14. $\dfrac{a_{n+1}}{a_n} = \dfrac{3}{2}$, $a_1 = 2 \Rightarrow \mathbf{a_{12} = ?}$

A) $\dfrac{3^{11}}{2}$
B) $\left(\dfrac{3}{2}\right)^{11}$
C) $\dfrac{3^{11}}{2^{10}}$
D) $\dfrac{3^{11}}{2^{12}}$
E) $\left(\dfrac{3}{2}\right)^{12}$

15. $\displaystyle\sum_{k=1}^{\infty} 3^{-k} = ?$

A) 1
B) $\dfrac{1}{3}$
C) $\dfrac{1}{2}$
D) $\dfrac{2}{3}$
E) $\dfrac{1}{4}$

16. $\displaystyle\sum_{i=0}^{\infty} \prod_{m=1}^{15} \log_{m+1} m = ?$

A) 0
B) $\dfrac{1}{2}$
C) $\dfrac{1}{3}$
D) $\dfrac{1}{4}$
E) $\dfrac{1}{5}$

Yanıtlar / Answers

1. E	4. E	7. A	10. D	13. D	16. A
2. D	5. D	8. D	11. C	14. C	
3. C	6. C	9. C	12. E	15. C	

1. $a_n = 5n + 5$

$a_3 = 5 \cdot 3 + 5$

$= 15 + 5$

$= 20$

Yanıt / Answer E

2. $a_n = 4n^2 + 3n$

$a_3 = 4 \cdot 3^2 + 3 \cdot 3$

$= 36 + 9 = 45$

$b_n = 3n + 8$

$b_2 = 3 \cdot 2 + 8 = 14$

$a_3 + b_2 = 45 + 14 = 59$

Yanıt / Answer D

3. $a_n = b_n$

$kn^2 + bn + c = 3n^2 + 4n + 5$

$k = 3, b = 4, c = 5$

$k + b + c = 3 + 4 + 5 = 12$

Yanıt / Answer C

4. $n + 1 = 3 \Rightarrow n = 2$

$a_3 = 3 \cdot 2^2 - 5 \cdot 2 + 14$

$= 2 + 14 = 16$

Yanıt / Answer E

5. $a_n = 4(n + 5) + 5$

$= 4n + 20 + 5$

$= 4n + 25$

Yanıt / Answer D

6. $a_n = \dfrac{3^{n+1}}{n} \Rightarrow a_{n+1} = \dfrac{3^{n+1+1}}{n+1}$

$= \dfrac{3^{n+2}}{n+1}$

Yanıt / Answer C

7. $n - 5 = 6 \Rightarrow n = 11$

$a_6 = 3^{11+1} \cdot 11 = 11 \cdot 3^{12}$

$n + 1 = 3 \Rightarrow n = 2$

$b_3 = \dfrac{4 \cdot 2^2 - 5 \cdot 2}{2} = \dfrac{16 - 10}{2} = \dfrac{6}{2} = 3$

$a_6 \cdot b_3 = 11 \cdot 3^{12} \cdot 3 = 11 \cdot 3^{13}$

Yanıt / Answer A

8. $a_{14} = \dfrac{a_{12} + a_{16}}{2}$

$= \dfrac{14 + 16}{2}$

$= \dfrac{30}{2} = 15$

Yanıt / Answer D

9. $a_{n+1}=\dfrac{3^{n+2}}{(n+1)!}\Rightarrow a_n=\dfrac{3^{n-1+2}}{(n-1+1)!}=\dfrac{3^{n+1}}{n!}$

$a_{n+1}=\dfrac{3^{n+2}}{(n+1)!}\Rightarrow a_{n-1}=\dfrac{3^{n-2+2}}{(n-2+1)!}=\dfrac{3^{n}}{(n-1)!}$

$$\frac{a_n}{a_{n-1}}=\frac{\dfrac{3^{n+1}}{n!}}{\dfrac{3^n}{(n-1)!}}=\frac{3^{n+1}}{n!}\cdot\frac{(n-1)!}{3^n}$$

$$=\frac{3^n\cdot 3}{n(n-1)!}\cdot\frac{(n-1)!}{3^n}$$

$$=\frac{3}{n}=\frac{1}{2}\Rightarrow n=6$$

Yanıt / Answer C

10. $4\equiv 1 \pmod 3 \Rightarrow a_4=2\cdot 4+4=12$

$3\equiv 0 \pmod 3 \Rightarrow a_3=3\cdot 3-1=8$

$5\equiv 2 \pmod 3 \Rightarrow a_5=2\cdot 5-2=8$

$a_4+a_3-a_5=12+8-8=12$

Yanıt / Answer D

11. $a_n=\dfrac{n^2-n-6}{n^2-4}$

$=\dfrac{(n-3)\cdot(n+2)}{(n-2)\cdot(n+2)}$

$=\dfrac{n-3}{n-2}=1-\dfrac{1}{n-2}\in Z$

$n-2=1\Rightarrow n=3$

Yanıt / Answer C

12. $n+1=5 \Rightarrow n=4$

$a_5=5\cdot 4^2-4^3=16$

$n+1=3 \Rightarrow n=2$

$b_3=4\cdot 2-4=4$

$c_2+3=5\cdot 2 \Rightarrow c_2=7$

$a_5-b_3+c_2=16-4+7=19$

Yanıt / Answer E

13. $n=6 \Rightarrow a_6=3+a_5$

$n=7 \Rightarrow a_7=3+a_6$

$\vdots$

$n=12 \Rightarrow a_{12}=3+a_{11}$

$+$

$a_6+a_7+\ldots+a_{12}=3+\ldots+3+a_5+a_6+\ldots+a_{11}$

$a_{12}=3+\ldots+3+a_5$

$a_{12}=3\cdot\left(\dfrac{12-6}{1}+1\right)+a_5$

$a_{12}=21+a_5=21+4=25$

Yanıt / Answer D

14. $n=1\Rightarrow\dfrac{a_2}{a_1}=\dfrac{3}{2}$

$n=2\Rightarrow\dfrac{a_3}{a_2}=\dfrac{3}{2}$

$\vdots$

$n=11\Rightarrow\dfrac{a_{12}}{a_{11}}=\dfrac{3}{2}$

$\times$

$$\frac{a_{12}}{a_1}=\underbrace{\frac{3}{2}\cdot\ldots\cdot\frac{3}{2}}_{11\text{ tane / times}}=a_{12}=\left(\frac{3}{2}\right)^{11}\cdot a_1=\frac{3^{11}}{2^{11}}\cdot 2=\frac{3^{11}}{2^{10}}$$

Yanıt / Answer C

15. $\displaystyle\sum_{k=1}^{\infty}\frac{1}{3^k}=\frac{1}{3}+\left(\frac{1}{3}\right)^2+\ldots$

$=\dfrac{1}{3}\left(1+\dfrac{1}{3}+\left(\dfrac{1}{3}\right)^2+\ldots\right)$

$=\dfrac{1}{3}\cdot\dfrac{1}{1-\dfrac{1}{3}}$

$=\dfrac{1}{3}\cdot\dfrac{3}{2}=\dfrac{1}{2}$

Yanıt / Answer C

16. $\displaystyle\prod_{m=1}^{15}\log_{m+1}m=\log_2 1\cdot\log_3 2\cdot\ldots\cdot\log_{16}15=\log_{16}1=0$

$\displaystyle\sum_{i=0}^{\infty}\prod_{m=1}^{15}\log_{m+1}m=\sum_{i=0}^{\infty}0=0$

Yanıt / Answer A

1. $a_n = \dfrac{n}{n+1} \Rightarrow \prod\limits_{k=12}^{24} \mathbf{a_k} = \mathbf{?}$

A) $\dfrac{1}{25}$ B) $\dfrac{4}{25}$ C) $\dfrac{8}{25}$

D) $\dfrac{12}{25}$ E) $\dfrac{14}{25}$

2. $a_n = \dfrac{3n-4}{5n+2}$, $a_p = \dfrac{4}{11} \Rightarrow \mathbf{p = ?}$

A) 1 B) 2 C) 3

D) 4 E) 5

3. $a_n = \prod\limits_{i=1}^{n} i \Rightarrow \mathbf{a_5 = ?}$

A) 6 B) 24 C) 120

D) 720 E) 0

4. $a_n = \dfrac{n+5}{n+1}$, $a_n > 2 \Rightarrow \sum \mathbf{n = ?}$

A) 0 B) 1 C) 2

D) 3 E) 4

5. $a_n = \sin\dfrac{\pi \cdot n}{2} \Rightarrow \mathbf{a_{15} + a_{19} = ?}$

A) –2 B) –1 C) 0

D) 1 E) 2

6. $a_n = \begin{cases} 5n+13, & n \geq 4 \\ 4n+10, & n < 4 \end{cases}$, $a_k = 18 \Rightarrow \mathbf{k = ?}$

A) 1 B) 2 C) 3

D) 4 E) 5

7. $a_n = 2 + \dfrac{3}{2} + \dfrac{4}{6} + \dfrac{5}{24} + \ldots \Rightarrow \mathbf{a_5 = ?}$

A) $\dfrac{1}{20}$ B) $\dfrac{1}{10}$ C) $\dfrac{1}{5}$

D) 1 E) $\dfrac{1}{2}$

8. $a_n = \sum\limits_{k=1}^{n} k \cdot (k+1) = 70 \Rightarrow \mathbf{n = ?}$

A) 1 B) 2 C) 3

D) 4 E) 5

9. $a_n = \sum_{m=1}^{n} (-1)^m (2m+1) \Rightarrow \mathbf{a_{12} = ?}$

A) 4 B) 7 C) 9

D) 12 E) 14

10. $\sum_{k=1}^{n} a_k = n! \Rightarrow \mathbf{a_{18} = ?}$

A) 16·16! B) 18·16! C) 17·17!

D) 16·17! E) 18·15!

11. $(x^2+2x+5)^4 = \ldots\ldots + Ax^6 + \ldots\ldots \Rightarrow \mathbf{A = ?}$

A) 12 B) 16 C) 18 D) 20 E) 24

12. $\frac{1}{2}+\frac{1}{4}+\frac{1}{6}+\frac{1}{8}+\ldots = ?$

A) $\frac{1}{2}$ B) $\frac{1}{2}\sum_{k=1}^{\infty} k$ C) $\sum_{k=1}^{\infty} \frac{1}{2k}$

D) $\sum_{k=1}^{\infty} \frac{1}{k^2}$ E) $\sum_{k=1}^{\infty} \frac{1}{3k}$

13. $1+\frac{1}{a}+\frac{1}{a^2}+\frac{1}{a^3}+\ldots = \frac{4}{3} \Rightarrow \mathbf{a = ?}$

A) 1 B) 2 C) 3

D) 4 E) 5

14. $\frac{x+y}{y} = 4 \Rightarrow \sum_{i=0}^{\infty} \left(\frac{y}{x}\right)^i = ?$

A) $\frac{1}{2}$ B) 1 C) $\frac{3}{2}$

D) 2 E) $\frac{5}{2}$

15. $n! = 1 \cdot 2 \cdot 3 \cdot \ldots \cdot (n-1) \cdot n$

$(a_n) = \frac{n^n}{n!} \Rightarrow \frac{\mathbf{a_{n+1}}}{\mathbf{a_n}} = \mathbf{?}$

A) $\left(\frac{1}{n+1}\right)^n$ B) $\frac{1}{n!}$ C) $\left(\frac{n+1}{n}\right)^n$

D) $\left(\frac{n}{n-1}\right)^n$ E) $\left(\frac{n-2}{n+1}\right)^n$

[YTÜ-YÖS 2012]

Yanıtlar / Answers

1. D	4. D	7. A	10. C	13. D
2. D	5. A	8. E	11. E	14. C
3. C	6. B	9. D	12. C	15. C

1. $\prod_{k=12}^{24} a_k = \prod_{k=12}^{24} \frac{k}{k+1} = \frac{12}{13}\cdot\frac{13}{14}\cdot\ldots\cdot\frac{24}{25} = \frac{12}{25}$

Yanıt / Answer D

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2. $a_n = \frac{3n-4}{5n+2} \Rightarrow a_p = \frac{3p-4}{5p+2} = \frac{4}{11}$

$33p - 44 = 20p + 8$

$13p = 52$

$p = 4$

Yanıt / Answer D

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3. $a_n = \prod_{i=1}^{n} i \Rightarrow a_5 = \prod_{i=1}^{5} i = 1\cdot2\cdot3\cdot4\cdot5 = 120$

Yanıt / Answer C

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4. $a_n > 2$

$\frac{n+5}{n+1} > 2$

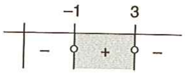
$\frac{n+5}{n+1} - 2 > 0$

$\frac{n+5-2n-2}{n+1} > 0$

$\frac{-n+3}{n+1} > 0$

$-n + 3 = 0 \qquad n + 1 = 0$

$n = 3 \qquad n = -1$



$n \in N \Rightarrow n = 0,1,2$

$\sum n = 0 + 1 + 2 = 3$

Yanıt / Answer D

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5. $a_n = \sin\frac{\pi\cdot n}{2}$

$a_{15} = \sin\frac{15\pi}{2} = \sin\frac{3\pi}{2} = -1$

$\begin{array}{r|l} 15 & 4 \\ -12 & 3 \\ \hline 3 & \end{array}$

$a_{19} = \sin\frac{19\pi}{2}$

$= \sin\frac{3\pi}{2} = -1$

$\begin{array}{r|l} 19 & 4 \\ -16 & 4 \\ \hline 3 & \end{array}$

$a_{15} + a_{19} = -1 - 1 = -2$

Yanıt / Answer A

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6. $n \geq 4 \Rightarrow a_n = 5n + 13$

$k \geq 4 \Rightarrow a_k = 5k + 13 = 18$

$5k = 5 \Rightarrow k = 1 < 4$

$n < 4 \Rightarrow a_n = 4n + 10$

$k < 4 \Rightarrow a_k = 4k + 10 = 18$

$4k = 8$

$k = 2 < 4 \Rightarrow k = 2$

Yanıt / Answer B

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7. $a_n = 2 + \frac{3}{2} + \frac{4}{6} + \frac{5}{24} + \ldots$

$= \frac{2}{1!} + \frac{3}{2!} + \frac{4}{3!} + \frac{5}{4!} + \ldots$

$(a_n) = \frac{n+1}{n!} \Rightarrow a_5 = \frac{6}{5!} = \frac{6}{120} = \frac{1}{20}$

Yanıt / Answer A

---

8. $a_n = \sum_{k=1}^{n} k\cdot(k+1)$

$= \sum_{k=1}^{n} (k^2 + k)$

$= \frac{n(n+1)(2n+1)}{6} + \frac{n(n+1)}{2}$

$= \frac{n(n+1)}{2}\left(\frac{2n+1}{3} + 1\right)$

$= \frac{n(n+1)(n+2)}{3} = 70$

$\Rightarrow n(n+1)(n+2) = 210 = 5\cdot6\cdot7$

Yanıt / Answer E

9. $a_n = \sum_{m=1}^{n} (-1)^m (2m+1)$

$$\Rightarrow a_{12} = \sum_{m=1}^{12} (-1)^m (2m+1)$$

$$= \underbrace{-3+5}_{2}\underbrace{-7+9}_{2}+\dots\underbrace{+25}_{2}$$

$$= \left(\frac{25-5}{4}+1\right)\cdot 2 = 6\cdot 2 = 12$$

Yanıt / Answer D

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10. $a_1 + a_2 + \dots + a_{18} = 18!$

$-\,/\; a_1 + a_2 + \dots + a_{17} = 17!$

$a_{18} = 18! - 17! = 17!\,(18-1) = 17\cdot 17!$

Yanıt / Answer C

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11. $A = \frac{4!}{2!\cdot 2!\cdot 0!}\cdot (x^2)^2\cdot (2x)^2\cdot (5)^0$

$$= \frac{24}{4\cdot 1}\cdot x^6\cdot 4$$

$$= 24$$

Yanıt / Answer E

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12. $\frac{1}{2}+\frac{1}{4}+\frac{1}{6}+\frac{1}{8}+\dots = \frac{1}{2}\left(1+\frac{1}{2}+\frac{1}{3}+\dots\right)$

$$= \frac{1}{2}\sum_{k=1}^{\infty}\frac{1}{k}$$

$$= \sum_{k=1}^{\infty}\frac{1}{2k}$$

Yanıt / Answer C

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13. $1+\frac{1}{a}+\frac{1}{a^2}+\frac{1}{a^3}+\dots = \frac{1}{1-\frac{1}{a}}$

$$= \frac{a}{a-1} = \frac{4}{3}$$

$$3a = 4a-4$$

$$a = 4$$

Yanıt / Answer D

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14. $\sum_{i=0}^{\infty}\left(\frac{y}{x}\right)^i = \left(\frac{y}{x}\right)^0 + \left(\frac{y}{x}\right)^1 + \dots$

$$= \frac{1}{1-\frac{y}{x}} = \frac{x}{x-y}$$

$$\left.\begin{array}{l} \frac{x+y}{y} = 4 \\ x+y = 4y \end{array}\right\} \Rightarrow x = 3y$$

$$\sum_{i=0}^{\infty}\left(\frac{y}{x}\right)^i = \frac{3y}{3y-y} = \frac{3y}{2y} = \frac{3}{2}$$

Yanıt / Answer C

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15. $\frac{a_{n+1}}{a_n} = \frac{\frac{(n+1)^{n+1}}{(n+1)!}}{\frac{n^n}{n!}}$

$$= \frac{(n+1)^{n+1}}{(n+1)!}\cdot\frac{n!}{n^n}$$

$$= \frac{(n+1)^{n+1}}{(n+1)}\cdot\frac{1}{n^n}$$

$$= \frac{(n+1)^n}{n^n} = \left(\frac{n+1}{n}\right)^n$$

Yanıt / Answer C

PERMÜTASYON, KOMBİNASYON, BİNOM AÇILIMI
PERMUTATION, COMBINATION, BINOMIAL EXPANSION

BÖLÜM
CHAPTER
2

Permütasyon – Kombinasyon / Permutation – Combination

Test 1

1. $P(n, 3) = 60 \Rightarrow \mathbf{P(n, 1) = ?}$

A) 4
B) 5
C) 6
D) 7
E) 8

2. $P(n, 2) - C(n, 2) = 10 \Rightarrow \mathbf{C(n, 1) = ?}$

A) 1
B) 2
C) 3
D) 4
E) 5

3. $P(n, 1) + C(n, 0) = 17,$

$\max \binom{n}{x} \Rightarrow \mathbf{x = ?}$

A) 2
B) 4
C) 8
D) 12
E) 16

4. $P(5, 4) + P(3, 1) = 3(x + 13) \Rightarrow \mathbf{x = ?}$

A) 14
B) 16
C) 18
D) 20
E) 28

5. $\binom{n}{0} + \binom{n}{1} + \binom{n}{2} + \ldots + \binom{n}{n-1} = 63 \Rightarrow \binom{n}{2} = ?$

A) 8
B) 10
C) 12
D) 14
E) 15

6. $\binom{n}{5} = \binom{n}{4} \Rightarrow \mathbf{n = ?}$

A) 9
B) 8
C) 7
D) 6
E) 5

7. $x \neq 5,$

$\binom{10}{3} + \binom{10}{4} + \binom{11}{5} = \binom{12}{x} \Rightarrow \mathbf{x = ?}$

A) 3
B) 4
C) 5
D) 6
E) 7

8. $$\frac{\binom{5}{0} + \binom{5}{1} + \ldots + \binom{5}{5}}{\binom{4}{0} + \binom{4}{1} + \ldots + \binom{4}{4}} = ?$$

A) 1
B) 2
C) 3
D) 4
E) 5

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9. $3 \cdot P(n, 1) + 2 \cdot C(n, 0) = 17 \Rightarrow$ **n = ?**

A) 3 B) 4 C) 5
D) 6 E) 7

10. $2 \cdot P(x + 1, 2) = 40 \Rightarrow$ **x = ?**

A) 1 B) 2 C) 3
D) 4 E) 5

11. $\binom{n}{2} = \sum_{k=1}^{14} k \Rightarrow$ **n = ?**

A) 12 B) 13 C) 14
D) 15 E) 16

12. $\binom{x}{2} + \binom{x}{3} + \binom{x+1}{4} = \binom{12}{4} \Rightarrow$ **x = ?**

A) 5 B) 6 C) 7
D) 9 E) 10

13. $P(5, 3) + C(n, 2) = (10000)_3 \Rightarrow$ **n = ?**

A) 1 B) 3 C) 5
D) 7 E) 9

14. $\binom{5}{2} + \binom{5}{1} = \binom{n+1}{2} \Rightarrow$ **$P\binom{n}{2} = ?$**

A) 12 B) 14 C) 16
D) 18 E) 20

15. $(x+1)^n = \binom{n}{0}x^n + \binom{n}{1}x^{n-1} + \ldots + = \binom{n}{n}x^0$

$(x+2)^5 = \ldots Ax^4 \Rightarrow$ **A = ?**

A) 5 B) 10 C) 15
D) 20 E) 25

16. $\binom{21}{20} + \binom{18}{17} - \binom{15}{14} = n(n+2) \Rightarrow$ **n = ?**

A) 1 B) 2 C) 3
D) 4 E) 5

Yanıtlar / Answers

1. B	4. E	7. E	10. D	13. D	16. D
2. E	5. E	8. B	11. D	14. E	
3. C	6. A	9. C	12. E	15. B	

1. $P(n,3)=\dfrac{n!}{(n-3)!}$

$=\dfrac{n(n-1)(n-2)(n-3)!}{(n-3)!}$

$=n(n-1)(n-2)$

$=60=5\cdot4\cdot3 \Rightarrow n=5$

$P(n,1)=P(5,1)=\dfrac{5!}{4!}=5$

Yanıt / Answer B

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2. $P(n,2)=\dfrac{n!}{(n-2)!}=\dfrac{n(n-1)(n-2)!}{(n-2)!}=n(n-1)$

$C(n,2)=\dfrac{n!}{2!(n-2)!}=\dfrac{n(n-1)(n-2)!}{2(n-2)!}=\dfrac{n(n-1)}{2}$

$P(n,2)-C(n,2)=n(n-1)-\dfrac{n(n-1)}{2}=\dfrac{n(n-1)}{2}=10$

$\Rightarrow n(n-1)=20=5\cdot4$

$n=5$

$C(n,1)=C(5,1)=\dfrac{5!}{4!\cdot1!}=5$

Yanıt / Answer E

3.
$$\left.\begin{aligned}P(n,1)&=\frac{n!}{(n-1)!}=n\\ C(n,0)&=\frac{n!}{n!\cdot0!}=1\end{aligned}\right\}\Rightarrow P(n,1)+C(n,0)=n+1=17\Rightarrow n=16$$

$\max\dbinom{n}{x}\Rightarrow x=\dfrac{16}{2}=8$

Yanıt / Answer C

4.
$$\left.\begin{aligned}P(5,4)&=\frac{5!}{1!}=120\\ P(3,1)&=\frac{3!}{2!}=3\end{aligned}\right\}\Rightarrow P(5,4)+P(3,1)=123$$

$3(x+13)=123$

$x+13=41$

$x=28$

Yanıt / Answer E

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5. $\dbinom{n}{0}+\dbinom{n}{1}+\dbinom{n}{2}+\ldots+\dbinom{n}{n-1}=2^n-1=63$

$2^n=64=2^6$

$n=6$

$\dbinom{6}{2}=\dfrac{6\cdot5}{2}=15$

Yanıt / Answer E

---

6. $\dbinom{n}{5}=\dbinom{n}{4}\Rightarrow n=5+4=9$

Yanıt / Answer A

7.
$$\left.\begin{aligned}\binom{10}{3}+\binom{10}{4}&=\binom{11}{4}\\ \binom{11}{4}+\binom{11}{5}&=\binom{12}{5}\end{aligned}\right\}\Rightarrow\binom{10}{3}+\binom{10}{4}+\binom{11}{5}=\binom{12}{5}=\binom{12}{x}$$

$x+5=12 \quad , \quad x=5$

$x=7$

Yanıt / Answer E

8.
$$\left.\begin{aligned}\binom{5}{0}+\binom{5}{1}+\ldots+\binom{5}{5}&=2^5\\ \binom{4}{0}+\binom{4}{1}+\ldots+\binom{4}{4}&=2^4\end{aligned}\right\}\Rightarrow\frac{\binom{5}{0}+\ldots+\binom{5}{5}}{\binom{4}{0}+\ldots+\binom{4}{4}}=\frac{2^5}{2^4}=2$$

Yanıt / Answer B

9. $$\left.\begin{array}{l} P(n,1)=\dfrac{n!}{(n-1)!}=n \\ C(n,0)=\dfrac{n!}{0!\cdot n!}=1 \end{array}\right\} \Rightarrow 3\cdot P(n,1)+2\cdot C(n,0)=17$$

$$3n+2=17$$

$$3n=15$$

$$n=5$$

Yanıt / Answer C

---

10. $$2\cdot P(x+1,2)=2\cdot\frac{(x+1)!}{(x+1-2)!}=\frac{2(x+1)x\cdot(x-1)!}{(x-1)!}$$

$$=2x(x+1)=40$$

$$x(x+1)=20$$

$$x=4$$

Yanıt / Answer D

---

11. $$\binom{n}{2}=\sum_{k=1}^{14}k=\frac{14\cdot 15}{2}=105$$

$$\frac{n(n-1)}{2}=105 \Rightarrow n(n-1)=210=15\cdot 14$$

$$\Rightarrow n=15$$

Yanıt / Answer D

---

12. $$\binom{x}{2}+\binom{x}{3}=\binom{x+1}{3}$$

$$\binom{x+1}{3}+\binom{x+1}{4}=\binom{x+2}{4}=\binom{12}{4} \Rightarrow x+2=12$$

$$x=10$$

Yanıt / Answer E

---

13. $$P(5,3)=\frac{5!}{2!}=\frac{5\cdot 4\cdot 3\cdot 2!}{2!}=60$$

$$C(n,2)=\frac{n!}{(n-2)!\cdot 2!}=\frac{n(n-1)}{2}$$

$$(10000)_3=1\cdot 3^4+0\cdot 3^3+0\cdot 3^2+0\cdot 3^1+0\cdot 3^0=81$$

$$P(5,3)+C(n,2)=(10000)_3$$

$$60+\frac{n(n-1)}{2}=81$$

$$\frac{n(n-1)}{2}=21$$

$$n(n-1)=42=7\cdot 6 \Rightarrow n=7$$

Yanıt / Answer D

---

14. $$\binom{5}{2}+\binom{5}{1}=\frac{5!}{3!\cdot 2!}+\frac{5!}{4!\cdot 1!}=10+5=15$$

$$\binom{n+1}{2}=\frac{(n+1)!}{(n+1-2)!\cdot 2!}=\frac{(n+1)\cdot n(n-1)!}{(n-1)!\cdot 2}$$

$$=\frac{n(n+1)}{2}=15$$

$$=n(n+1)=30 \Rightarrow n=5$$

$$P\binom{n}{2}=P\binom{5}{2}=\frac{5!}{3!}=20$$

Yanıt / Answer E

---

15. $$A=\binom{5}{1}\cdot 2=5\cdot 2=10$$

Yanıt / Answer B

---

16. $$\binom{21}{20}+\binom{18}{17}-\binom{15}{14}=21+18-15=n(n+2)$$

$$\Rightarrow n=4$$

Yanıt / Answer D

1. $(x + 2)^4 = \ldots\ldots + Ax^2 \Rightarrow$ **A = ?**

A) 18 B) 24 C) 26

D) 28 E) 30

2. $(x - 4)^5 = \ldots\ldots + Ax \Rightarrow$ **A = ?**

A) 2^4 B) $3 \cdot 2^6$ C) $5 \cdot 2^8$

D) 2^{10} E) $5 \cdot 2^{12}$

3. $(x^2 - 5)^9 = \ldots\ldots + Ax^6 \Rightarrow$ **A = ?**

A) $84 \cdot 5^6$ B) 5^6 C) 84

D) $84 \cdot 5^5$ E) $84 \cdot 5^4$

4. $\left(x + \frac{2}{x}\right)^5 = \ldots\ldots + Ax \Rightarrow$ **A = ?**

A) 10 B) 20 C) 30

D) 40 E) 50

5. $\left(-x + \frac{1}{x}\right)^6 = \ldots\ldots + A \Rightarrow$ **A = ?**

A) –10 B) –20 C) –30

D) –40 E) –50

6. $\left(x^2 - \frac{1}{\sqrt{x}}\right)^4 = \ldots\ldots + Ax^3 \Rightarrow$ **A = ?**

A) 1 B) 2 C) 3

D) 6 E) 8

7. $x^3 + 3x^2y = 14,$

$3xy^2 + y^3 = 13 \Rightarrow$ **x + y = ?**

A) 1 B) 2 C) 3

D) 4 E) 5

8. $(2x + y)^4 = \ldots\ldots + Ax^2y^2 \Rightarrow$ **A = ?**

A) 12 B) 16 C) 18

D) 24 E) 26

9. $(2x-3y)^5 = \ldots\ldots + Ax^3y^2 \Rightarrow$ **A = ?**

A) 180
B) 240
C) 360
D) 480
E) 720

10. $(x^2+3y)^4 = \ldots\ldots + Ax^4y^2 \Rightarrow$ **A = ?**

A) 18
B) 22
C) 24
D) 27
E) 54

11. $(x+y-z)^6 = \ldots\ldots + Ax^4yz \Rightarrow$ **A = ?**

A) –10
B) –20
C) –30
D) –40
E) –50

12. $(x-2y+3z)^8 = \ldots\ldots + Ax^3y^2z^3 \Rightarrow$ **A = ?**

A) $2^6 \cdot 7 \cdot 5 \cdot 3^2$
B) $2^6 \cdot 7 \cdot 5 \cdot 3^3$
C) $2^6 \cdot 7 \cdot 5 \cdot 3$
D) $2^5 \cdot 7 \cdot 5 \cdot 3^3$
E) $2^5 \cdot 7 \cdot 5 \cdot 3^2$

13. $(2x-y+z^2)^5 = \ldots\ldots + Ax^2yz^4 \Rightarrow$ **A = ?**

A) –40
B) –60
C) –80
D) –100
E) –120

14. $(3x+y^2-z)^6 = \ldots\ldots + Ax^2y^4z^2 \Rightarrow$ **A = ?**

A) 30
B) 90
C) 270
D) 540
E) 810

15. $(x-y^2+z)^5 = \ldots\ldots - Ax^2y^2z^2 \Rightarrow$ **A = ?**

A) 10
B) 20
C) 30
D) 40
E) 50

16. $(x^2y+xy^2)^{10} = \ldots\ldots + Ax^{15}y^{15} \Rightarrow$ **A = ?**

A) 56
B) 78
C) 112
D) 252
E) 260

Yanıtlar / Answers

1. B	4. D	7. C	10. E	13. E	16. D
2. C	5. B	8. D	11. C	14. E	
3. A	6. D	9. E	12. B	15. C	

1. $(x+2)^4 = \ldots \binom{4}{2}(x)^2(2)^2$

$\Rightarrow A = \binom{4}{2}\cdot 2^2 = 6\cdot 4 = 24$

Yanıt / Answer B

---

2. $(x-4)^5 = \ldots\ldots + \binom{5}{4}(x)^1(-4)^4$

$\Rightarrow A = \binom{5}{4}\cdot 4^4 = 5\cdot 2^8$

Yanıt / Answer C

---

3. $(x^2-5)^9 = \ldots\ldots + \binom{9}{6}(x^2)^3(-5)^6$

$\Rightarrow A = \binom{9}{6}\cdot 5^6 = 84\cdot 5^6$

Yanıt / Answer A

---

4. $(x+\frac{2}{x})^5 = \ldots\ldots + \binom{5}{2}(x)^3\left(\frac{2}{x}\right)^2$

$\Rightarrow A = \binom{5}{2}\cdot 2^2 = 10\cdot 4 = 40$

Yanıt / Answer D

---

5. $(-x+\frac{1}{x})^6 = \ldots\ldots + \binom{6}{3}(-x)^3\left(\frac{1}{x}\right)^3$

$\Rightarrow A = \binom{6}{3}\cdot(-1)^3 = -20$

Yanıt / Answer B

---

6. $(x^2-\frac{1}{\sqrt{x}})^4 = \ldots\ldots + \binom{4}{2}(x^2)^2\left(\frac{1}{\sqrt{x}}\right)^2$

$\Rightarrow A = \binom{4}{2} = 6$

Yanıt / Answer D

7.

$$\begin{array}{r} x^3+3x^2y=14 \\ +\ \ 3xy^2+y^3=13 \\ \hline x^3+3x^2y+3xy^2+y^3=27 \end{array}$$

$$(x+y)^3 = 3^3$$

$$x+y=3$$

Yanıt / Answer C

---

8. $(2x+y)^4 = \ldots\ldots + \binom{4}{2}(2x)^2(y)^2$

$\Rightarrow A = \binom{4}{2}2^2 = 6\cdot 4 = 24$

Yanıt / Answer D

9. $(2x-3y)^5 = \ldots\ldots + \binom{5}{2}(2x)^3(-3y)^2$

$$\Rightarrow A = \binom{5}{2}\cdot 2^3\cdot(-3)^2 = 10\cdot 8\cdot 9 = 720$$

Yanıt / Answer E

10. $(x^2+3y)^4 = \ldots\ldots + \binom{4}{2}(x^2)^2(3y)^2$

$$\Rightarrow A = \binom{4}{2}\cdot 3^2 = 6\cdot 9 = 54$$

Yanıt / Answer E

11. $(x+y-z)^6 = \ldots\ldots + \dfrac{6!}{4!\cdot 1!\cdot 1!}(x)^4(y)^1(-z)^1$

$$\Rightarrow A = \frac{6!}{4!\cdot 1!\cdot 1!}(-1)^1 = \frac{720}{24}(-1) = -30$$

Yanıt / Answer C

12. $(x-2y+3z)^8 = \ldots\ldots + \dfrac{8!}{3!\cdot 2!\cdot 3!}(x)^3(-2y)^2(3z)^3$

$$\Rightarrow A = \frac{8\cdot 7\cdot 6\cdot 5\cdot 4\cdot 3!}{3!\cdot 2!\cdot 3!}\cdot 4\cdot 3^3$$

$$= 2^6\cdot 7\cdot 5\cdot 3^3$$

Yanıt / Answer B

13. $(2x-y+z^2)^5 = \ldots\ldots + \dfrac{5!}{2!\cdot 1!\cdot 2!}(2x)^2(-y)^1(z^2)^2$

$$\Rightarrow A = \frac{5!}{2\cdot 2}\cdot 4\cdot(-1)\cdot 1 = -120$$

Yanıt / Answer E

14. $(3x+y^2-z)^6 = \ldots\ldots + \dfrac{6!}{2!\cdot 2!\cdot 2!}(3x)^2(y^2)^2(-z)^2$

$$\Rightarrow A = \frac{6!}{2!\cdot 2!\cdot 2!}\cdot 3^2\cdot(-1)^2$$

$$= \frac{6\cdot 5\cdot 4\cdot 3\cdot 2!}{4\cdot 2!}\cdot 9 = 810$$

Yanıt / Answer E

15. $(x-y^2+z)^5 = \ldots\ldots + \dfrac{5!}{2!\cdot 1!\cdot 2!}(x)^2(-y^2)^1(z)^2$

$$\Rightarrow A = \frac{5!}{2!\cdot 1!\cdot 2!}\cdot(-1)^1 = 30$$

Yanıt / Answer C

16. $(x^2y+xy^2)^{10} = \ldots\ldots + \binom{10}{5}(x^2y)^5\cdot(xy^2)^5$

$$\Rightarrow A = \binom{10}{5} = \frac{10\cdot 9\cdot 8\cdot 7\cdot 6}{5\cdot 4\cdot 3\cdot 2} = 252$$

Yanıt / Answer D

MATRİS ve DETERMİNANT
MATRIX and DETERMINANT

BÖLÜM
CHAPTER
3

Matris / Matrix

Test 1

1. $A=\begin{bmatrix}4 & -2\\ -1 & 3\end{bmatrix}, B=\begin{bmatrix}-1 & 0\\ 2 & -2\end{bmatrix} \Rightarrow \mathbf{A+B=?}$

A) $\begin{bmatrix}3 & -2\\ 1 & 1\end{bmatrix}$ B) $\begin{bmatrix}3 & 2\\ -1 & -1\end{bmatrix}$ C) $\begin{bmatrix}2 & -2\\ 1 & 0\end{bmatrix}$

D) $\begin{bmatrix}5 & 2\\ 3 & 5\end{bmatrix}$ E) $\begin{bmatrix}5 & -2\\ -3 & 1\end{bmatrix}$

2. $A=\begin{bmatrix}2 & 3\\ 1 & -2\\ -1 & 4\end{bmatrix}, \; B=\begin{bmatrix}3 & -1\\ 2 & 3\\ 1 & -3\end{bmatrix} \Rightarrow \mathbf{A+2B=?}$

A) $\begin{bmatrix}8 & 1\\ 5 & 4\\ 0 & 1\end{bmatrix}$ B) $\begin{bmatrix}8 & 1\\ 5 & 4\\ 1 & -2\end{bmatrix}$ C) $\begin{bmatrix}6 & 2\\ 3 & 5\\ 1 & -2\end{bmatrix}$

D) $\begin{bmatrix}6 & 2\\ -3 & 4\\ 1 & -3\end{bmatrix}$ E) $\begin{bmatrix}5 & 4\\ 3 & 1\\ 0 & 1\end{bmatrix}$

3. $A=\begin{bmatrix}2 & 1\\ 1 & 0\\ 4 & 3\end{bmatrix}, \; B=\begin{bmatrix}1 & 4 & 0\\ 2 & 3 & 5\end{bmatrix} \Rightarrow \mathbf{A\cdot B=?}$

A) $\begin{bmatrix}4 & 5 & 11\\ 1 & 4 & 5\\ 10 & 15 & 20\end{bmatrix}$ B) $\begin{bmatrix}4 & 11 & 5\\ 1 & 4 & 0\\ 10 & 15 & 25\end{bmatrix}$

C) $\begin{bmatrix}4 & 1 & 5\\ 1 & 4 & 0\\ 10 & 25 & 15\end{bmatrix}$ D) $\begin{bmatrix}4 & 11 & 5\\ 1 & 4 & 0\\ 10 & 25 & 15\end{bmatrix}$

E) $\begin{bmatrix}4 & 11 & 3\\ 2 & 4 & 0\\ 10 & 25 & 15\end{bmatrix}$

4. $x\begin{bmatrix}3\\ 4\end{bmatrix}+2\begin{bmatrix}1\\ y\end{bmatrix}=\begin{bmatrix}5\\ -2\end{bmatrix} \Rightarrow \mathbf{x+y=?}$

A) –2 B) –1 C) 0 D) 1 E) 2

5. $A=\begin{bmatrix}1 & -2\\ 3 & 4\end{bmatrix}, \; B=\begin{bmatrix}4 & -2\\ 3 & 1\end{bmatrix}, \; 3A+C=2B$

$\Rightarrow \mathbf{C=?}$

A) $\begin{bmatrix}-3 & 2\\ 5 & 10\end{bmatrix}$ B) $\begin{bmatrix}5 & 3\\ -3 & 10\end{bmatrix}$ C) $\begin{bmatrix}3 & 2\\ -3 & -10\end{bmatrix}$

D) $\begin{bmatrix}3 & 5\\ -2 & -10\end{bmatrix}$ E) $\begin{bmatrix}5 & 2\\ -3 & -10\end{bmatrix}$

6. $A=\begin{bmatrix}\sqrt{50} & 1\\ 5 & 2\end{bmatrix}, \; B=\begin{bmatrix}\sqrt{18} & 2\\ 0 & \log x\end{bmatrix}$

$C=\begin{bmatrix}2^y & 3\\ 5 & -\log_{\frac{1}{2}} 8\end{bmatrix}$

$A+B=C \Rightarrow \mathbf{x\cdot y=?}$

A) 2 B) $\frac{5}{2}$ C) 3 D) 12 E) 35

7. $A=\begin{bmatrix}2x & 4\\ 3 & -y\end{bmatrix}$ $\quad B=\begin{bmatrix}y & 2\\ 1 & x\end{bmatrix}$

$C=\begin{bmatrix}5 & -1\\ 0 & -2\end{bmatrix}$

$3B+2C=A \Rightarrow$ **$x+y=?$**

A) –3 B) –2 C) 0

D) 2 E) 3

8. $\begin{bmatrix}2x+1 & 1\\ y+2 & 0\end{bmatrix}=\begin{bmatrix}5 & 1\\ 5 & 0\end{bmatrix} \Rightarrow$ **$x+y=?$**

A) 1 B) 2 C) 3

D) 4 E) 5

9. $\begin{bmatrix}x & 3\\ 2 & y\end{bmatrix}\cdot\begin{bmatrix}2\\ 1\end{bmatrix}=\begin{bmatrix}-5\\ 3\end{bmatrix} \Rightarrow$ **$x\cdot y=?$**

A) 2 B) 3 C) 4

D) 6 E) 8

10. $A=\begin{bmatrix}-2 & 3 & 4\\ 1 & 0 & -3\end{bmatrix} \Rightarrow$ **$A\cdot A^T=?$**

A) $\begin{bmatrix}29 & -14\\ -14 & 10\end{bmatrix}$ B) $\begin{bmatrix}27 & -12\\ -12 & 8\end{bmatrix}$

C) $\begin{bmatrix}29 & -14\\ 14 & -10\end{bmatrix}$ D) $\begin{bmatrix}27 & -12\\ 12 & 8\end{bmatrix}$

E) $\begin{bmatrix}29 & 14\\ -14 & -10\end{bmatrix}$

11. $$\left.\begin{array}{l} i^2=-1 \\ \begin{bmatrix}3+ai & 1\\ b & 2i\end{bmatrix}\begin{bmatrix}-1\\ -2\end{bmatrix}=\begin{bmatrix}-2+b+2i\\ 3-ci\end{bmatrix}\end{array}\right\} \Rightarrow \mathbf{a+b+c=?}$$

A) –4 B) –3 C) –2 D) –1 E) 0

12. $A=\begin{bmatrix}1 & 0 & -1\\ 2 & -2 & 0\end{bmatrix} \Rightarrow$ **$A^T\cdot A=?$**

A) $\begin{bmatrix}5 & -4 & -1\\ -4 & 4 & 0\\ -1 & 0 & 1\end{bmatrix}$ B) $\begin{bmatrix}5 & -4 & -1\\ 4 & -4 & 0\\ -1 & 0 & 1\end{bmatrix}$

A) $\begin{bmatrix}5 & 4 & -1\\ -4 & 4 & 0\\ -1 & 0 & -1\end{bmatrix}$ D) $\begin{bmatrix}5 & -4 & 1\\ 4 & -4 & 0\\ -1 & 0 & -1\end{bmatrix}$

E) $\begin{bmatrix}5 & 4 & 1\\ 4 & 4 & 0\\ 1 & 0 & 1\end{bmatrix}$

[ANKARA ÜNV. YÖS 2013]

Yanıtlar (Answers)			
1. A	**4. A**	**7. C**	**10. A**
2. B	**5. E**	**8. E**	**11. D**
3. D	**6. E**	**9. C**	**12. A**

1. $A+B=\begin{bmatrix}4 & -2\\ -1 & 3\end{bmatrix}+\begin{bmatrix}-1 & 0\\ 2 & -2\end{bmatrix}$

$=\begin{bmatrix}4-1 & -2+0\\ -1+2 & 3-2\end{bmatrix}=\begin{bmatrix}3 & -2\\ 1 & 1\end{bmatrix}$

Yanıt / Answer A

2. $A=\begin{bmatrix}2 & 3\\ 1 & -2\\ -1 & 4\end{bmatrix},\ B=\begin{bmatrix}3 & -1\\ 2 & 3\\ 1 & -3\end{bmatrix}\Rightarrow$

$A+2B=\begin{bmatrix}2 & 3\\ 1 & -2\\ -1 & 4\end{bmatrix}+2\begin{bmatrix}3 & -1\\ 2 & 3\\ 1 & -3\end{bmatrix}$

$=\begin{bmatrix}2 & 3\\ 1 & -2\\ -1 & 4\end{bmatrix}+\begin{bmatrix}6 & -2\\ 4 & 6\\ 2 & -6\end{bmatrix}$

$=\begin{bmatrix}2+6 & 3-2\\ 1+4 & -2+6\\ -1+2 & 4-6\end{bmatrix}=\begin{bmatrix}8 & 1\\ 5 & 4\\ 1 & -2\end{bmatrix}$

Yanıt / Answer B

3. $A=\begin{bmatrix}2 & 1\\ 1 & 0\\ 4 & 3\end{bmatrix},\ B=\begin{bmatrix}1 & 4 & 0\\ 2 & 3 & 5\end{bmatrix}\Rightarrow$

$A\cdot B=\begin{bmatrix}2 & 1\\ 1 & 0\\ 4 & 3\end{bmatrix}\cdot\begin{bmatrix}1 & 4 & 0\\ 2 & 3 & 5\end{bmatrix}$

$=\begin{bmatrix}2+2 & 8+3 & 0+5\\ 1+0 & 4+0 & 0+0\\ 4+6 & 16+9 & 0+15\end{bmatrix}=\begin{bmatrix}4 & 11 & 5\\ 1 & 4 & 0\\ 10 & 25 & 15\end{bmatrix}$

Yanıt / Answer D

4. $x\begin{bmatrix}3\\ 4\end{bmatrix}+2\begin{bmatrix}1\\ y\end{bmatrix}=\begin{bmatrix}5\\ -2\end{bmatrix}\Rightarrow\begin{bmatrix}3x\\ 4x\end{bmatrix}+\begin{bmatrix}2\\ 2y\end{bmatrix}=\begin{bmatrix}5\\ -2\end{bmatrix}$

$\begin{bmatrix}3x+2\\ 4x+2y\end{bmatrix}=\begin{bmatrix}5\\ -2\end{bmatrix}$

$$\begin{array}{r|r}3x+2=5 & 4x+2y=-2\\ 3x=3 & 4+2y=-2\\ x=1 & 2y=-6\\ & y=-3\end{array}$$

$x+y=1-3=-2$

Yanıt / Answer A

5. $A=\begin{bmatrix}1 & -2\\ 3 & 4\end{bmatrix},\ B=\begin{bmatrix}4 & -2\\ 3 & 1\end{bmatrix}$

$3A+C=2B$

$3\cdot\begin{bmatrix}1 & -2\\ 3 & 4\end{bmatrix}+C=2\cdot\begin{bmatrix}4 & -2\\ 3 & 1\end{bmatrix}$

$\begin{bmatrix}3 & -6\\ 9 & 12\end{bmatrix}+C=\begin{bmatrix}8 & -4\\ 6 & 2\end{bmatrix}$

$C=\begin{bmatrix}8 & -4\\ 6 & 2\end{bmatrix}-\begin{bmatrix}3 & -6\\ 9 & 12\end{bmatrix}$

$=\begin{bmatrix}8-3 & -4+6\\ 6-9 & 2-12\end{bmatrix}=\begin{bmatrix}5 & 2\\ -3 & -10\end{bmatrix}$

Yanıt / Answer E

6. $A=\begin{bmatrix}5\sqrt{2} & 1\\ 5 & 2\end{bmatrix},\ B=\begin{bmatrix}3\sqrt{2} & 2\\ 0 & \log x\end{bmatrix},\ C=\begin{bmatrix}2^y & 3\\ 5 & -\log_{\frac{1}{2}}8\end{bmatrix}$

$A+B=C$

$\begin{bmatrix}5\sqrt{2} & 1\\ 5 & 2\end{bmatrix}+\begin{bmatrix}3\sqrt{2} & 2\\ 0 & \log x\end{bmatrix}=C\Rightarrow$

$\begin{bmatrix}8\sqrt{2} & 3\\ 5 & 2+\log x\end{bmatrix}=\begin{bmatrix}2^y & 3\\ 5 & -\log_{\frac{1}{2}}8\end{bmatrix}$

$$\Rightarrow\begin{cases}8\sqrt{2}=2^y\Rightarrow 2^{3+\frac{1}{2}}=2^y\Rightarrow y=\dfrac{7}{2}\\ 2+\log x=\log_2 8\Rightarrow 2+\log x=3\\ \qquad\Rightarrow \log x=1\Rightarrow x=10\end{cases}$$

$x\cdot y=\dfrac{7}{2}\cdot 10=35$

Yanıt / Answer E

7. $3B+2C=A \Rightarrow$

$$3\begin{bmatrix} y & 2 \\ 1 & x \end{bmatrix}+2\begin{bmatrix} 5 & -1 \\ 0 & -2 \end{bmatrix}=\begin{bmatrix} 2x & 4 \\ 3 & -y \end{bmatrix}$$

$$\begin{bmatrix} 3y & 6 \\ 3 & 3x \end{bmatrix}+\begin{bmatrix} 10 & -2 \\ 0 & -4 \end{bmatrix}=\begin{bmatrix} 2x & 4 \\ 3 & -y \end{bmatrix}$$

$$\begin{bmatrix} 3y+10 & 6-2 \\ 3+0 & 3x-4 \end{bmatrix}=\begin{bmatrix} 2x & 4 \\ 3 & -y \end{bmatrix}$$

$3y+10=2x \Rightarrow \quad 3y-2x=-10$

$3x-4=-y \Rightarrow \quad -3/\,3x+y=4$

$-11x=-22$

$x=2 \Rightarrow y=-2$

$\Rightarrow x+y=0$

Yanıt / Answer C

8.

$$\begin{bmatrix} 2x+1 & 1 \\ y+2 & 0 \end{bmatrix}=\begin{bmatrix} 5 & 1 \\ 5 & 0 \end{bmatrix}$$

$2x+1=5$	$y+2=5$
$2x=4$	$y=3$
$x=2$	

$x+y=2+3=5$

Yanıt / Answer E

9.

$$\begin{bmatrix} x & 3 \\ 2 & y \end{bmatrix}\cdot\begin{bmatrix} 2 \\ 1 \end{bmatrix}=\begin{bmatrix} -5 \\ 3 \end{bmatrix}$$

$$\begin{bmatrix} 2x+3 \\ 4+y \end{bmatrix}=\begin{bmatrix} -5 \\ 3 \end{bmatrix}$$

$2x+3=-5$	$4+y=3$
$2x=-8$	$y=-1$
$x=-4$	

$\Rightarrow x\cdot y=(-4)\cdot(-1)=4$

Yanıt / Answer C

10.

$$A=\begin{bmatrix} -2 & 3 & 4 \\ 1 & 0 & -3 \end{bmatrix},\quad A^T=\begin{bmatrix} -2 & 1 \\ 3 & 0 \\ 4 & -3 \end{bmatrix}$$

$$A\cdot A^T=\begin{bmatrix} 4+9+16 & -2+0-12 \\ -2+0-12 & 1+0+9 \end{bmatrix}$$

$$=\begin{bmatrix} 29 & -14 \\ -14 & 10 \end{bmatrix}$$

Yanıt / Answer A

11.

$$\begin{bmatrix} 3+ai & 1 \\ b & 2i \end{bmatrix}\cdot\begin{bmatrix} -1 \\ -2 \end{bmatrix}=\begin{bmatrix} -2+b+2i \\ 3-ci \end{bmatrix}$$

$$\Rightarrow \begin{bmatrix} -3-ai-2 \\ -b-4i \end{bmatrix}=\begin{bmatrix} -2+b+2i \\ 3-ci \end{bmatrix}$$

$$-5-ai=(b-2)+2i \Rightarrow \begin{cases} b-2=-5 \Rightarrow b=-3 \\ -a=2 \Rightarrow a=-2 \end{cases}$$

$-b-4i=3-ci \Rightarrow c=4$

$a+b+c=-3-2+4=-1$

Yanıt / Answer D

12.

$$A=\begin{bmatrix} 1 & 0 & -1 \\ 2 & -2 & 0 \end{bmatrix} \Rightarrow A^T=\begin{bmatrix} 1 & 2 \\ 0 & -2 \\ -1 & 0 \end{bmatrix}$$

$$A^T\cdot A=\begin{bmatrix} 1 & 2 \\ 0 & -2 \\ -1 & 0 \end{bmatrix}\cdot\begin{bmatrix} 1 & 0 & -1 \\ 2 & -2 & 0 \end{bmatrix}$$

$$=\begin{bmatrix} 5 & -4 & -1 \\ -4 & 4 & 0 \\ -1 & 0 & 1 \end{bmatrix}$$

Yanıt / Answer A

1. $A=\begin{bmatrix}2 & 3 & -1\\ 4 & 0 & 5\end{bmatrix} \Rightarrow \mathbf{A\cdot A^T=?}$

A) $\begin{bmatrix}41 & 3\\ 14 & 3\end{bmatrix}$ B) $\begin{bmatrix}14 & 3\\ 3 & 41\end{bmatrix}$ C) $\begin{bmatrix}2 & 14\\ 41 & 2\end{bmatrix}$

D) $\begin{bmatrix}1 & 21\\ 12 & 1\end{bmatrix}$ E) $\begin{bmatrix}12 & 3\\ 3 & 21\end{bmatrix}$

2. $\begin{bmatrix}-1 & 1\\ 0 & 1\end{bmatrix}\cdot\begin{bmatrix}x & y\\ z & t\end{bmatrix}=\begin{bmatrix}2 & -3\\ 4 & 2\end{bmatrix} \Rightarrow \mathbf{x\cdot y\cdot z\cdot t=?}$

A) 60 B) 70 C) 80 D) 90 E) 100

3. $\begin{bmatrix}a & b\\ c & d\end{bmatrix}\cdot\begin{bmatrix}-1 & 1\\ 2 & 3\end{bmatrix}=\begin{bmatrix}3 & 7\\ 3 & 7\end{bmatrix}$

$\Rightarrow \mathbf{a+b+c+d\ =?}$

A) 6 B) 8 C) 10 D) 12 E) 14

4. $A=\begin{bmatrix}a & 3\\ 1 & 2\end{bmatrix}$ ve(and) $A.A^T=\begin{bmatrix}18 & 9\\ 9 & 5\end{bmatrix} \Rightarrow \mathbf{a=?}$

A) 0 B) 1 C) 2 D) 3 E) 4

5. $\begin{bmatrix}5 & 3\\ 3 & 2\end{bmatrix}\cdot A-\begin{bmatrix}2 & 4\\ 3 & 2\end{bmatrix}=\begin{bmatrix}0 & 1\\ -2 & 2\end{bmatrix} \Rightarrow \mathbf{A=?}$

A) $\begin{bmatrix}1 & 2\\ 1 & 4\end{bmatrix}$ B) $\begin{bmatrix}5 & -2\\ -1 & 1\end{bmatrix}$ C) $\begin{bmatrix}1 & -2\\ -1 & 5\end{bmatrix}$

D) $\begin{bmatrix}2 & 1\\ -3 & 5\end{bmatrix}$ E) $\begin{bmatrix}-1 & 2\\ 1 & -5\end{bmatrix}$

6. $A=\begin{bmatrix}1 & 0\\ 2 & 1\end{bmatrix}, B=\begin{bmatrix}a & b\\ c & d\end{bmatrix}$

$A^3\cdot B=A \Rightarrow \mathbf{c=?}$

A) –4 B) –2 C) 0 D) 2 E) 4

7. $x>0$,

$A=\begin{bmatrix}2 & x\\ -1 & y\end{bmatrix}$, $B=\begin{bmatrix}5 & 0\\ 0 & 5\end{bmatrix}$

$A\,.\,A^T=B \Rightarrow \mathbf{x+y=?}$

A) –6 B) –5 C) –4 D) –3 E) –2

8. $A=\begin{bmatrix}3 & 0\\ -1 & 2\end{bmatrix}$ ve(and) $B=\begin{bmatrix}1 & a\\ b & -1\end{bmatrix}$

$A \cdot B = B \cdot A \Rightarrow \mathbf{a \cdot b = ?}$

A) –2 B) –1 C) 0 D) 1 E) 2

9. $\begin{bmatrix}x & 1\\ -x & y\end{bmatrix} \cdot \begin{bmatrix}5\\ 3\end{bmatrix} = \begin{bmatrix}-2\\ -7\end{bmatrix} \Rightarrow \mathbf{x - y = ?}$

A) –7 B) –4 C) –3 D) 3 E) 7

10. $\begin{bmatrix}2 & -1\\ 0 & 4\end{bmatrix} \cdot \begin{bmatrix}a\\ 1+a^2\end{bmatrix} = \begin{bmatrix}-4\\ b\end{bmatrix}$

$\mathbf{\sum b = ?}$

A) 12 B) 24 C) 36 D) 48 E) 60

11. $A=\begin{bmatrix}2 & 1\\ -1 & 3\end{bmatrix}$, $B=\begin{bmatrix}-1 & 2\\ 3 & -2\end{bmatrix}$

$\Rightarrow \mathbf{A^2 - B^2 = ?}$

A) $\begin{bmatrix}-9 & 10\\ 2 & 3\end{bmatrix}$ B) $\begin{bmatrix}-4 & 11\\ 4 & -2\end{bmatrix}$ C) $\begin{bmatrix}1 & 8\\ 6 & -7\end{bmatrix}$

D) $\begin{bmatrix}-9 & 14\\ 2 & 3\end{bmatrix}$ E) $\begin{bmatrix}-9 & 6\\ 2 & 3\end{bmatrix}$

12. $A=\begin{bmatrix}1 & 1\\ -1 & 2\end{bmatrix}$ $I=\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$

$\Rightarrow \mathbf{A^2 - 3A + 3I = ?}$

A) $\begin{bmatrix}0 & 1\\ 1 & 1\end{bmatrix}$ B) $\begin{bmatrix}-3 & 0\\ 0 & -3\end{bmatrix}$ C) $\begin{bmatrix}0 & 0\\ 0 & 9\end{bmatrix}$

D) $\begin{bmatrix}1 & 1\\ 1 & 1\end{bmatrix}$ E) $\begin{bmatrix}0 & 0\\ 0 & 0\end{bmatrix}$

13. $A=\begin{bmatrix}1 & 3\\ 0 & 2\end{bmatrix} \Rightarrow \mathbf{A^3 = ?}$

A) $\begin{bmatrix}1 & 9\\ 0 & 4\end{bmatrix}$ B) $\begin{bmatrix}1 & 9\\ 0 & 8\end{bmatrix}$ C) $\begin{bmatrix}1 & 27\\ 0 & 8\end{bmatrix}$

D) $\begin{bmatrix}1 & 21\\ 0 & 8\end{bmatrix}$ E) $\begin{bmatrix}1 & 18\\ 0 & 12\end{bmatrix}$

14. $A^{-1}=\begin{bmatrix}3 & -1\\ -2 & 2\end{bmatrix} \Rightarrow \mathbf{A = ?}$

A) $\begin{bmatrix}-3/2 & 3/4\\ 1/2 & 1/2\end{bmatrix}$ B) $\begin{bmatrix}1/3 & 1/4\\ 2/3 & 1\end{bmatrix}$ C) $\begin{bmatrix}-1/4 & 1/4\\ 0 & -1\end{bmatrix}$

D) $\begin{bmatrix}1/2 & -3/4\\ -1/2 & 3/4\end{bmatrix}$ E) $\begin{bmatrix}1/2 & 1/4\\ 1/2 & 3/4\end{bmatrix}$

[YTÜ. YÖS 2013]

Yanıtlar (Answers)

1. B	4. D	7. D	10. D	13. D
2. C	5. C	8. C	11. B	14. E
3. A	6. A	9. D	12. E	

1. $A=\begin{bmatrix}2 & 3 & -1\\ 4 & 0 & 5\end{bmatrix} \Rightarrow A^T=\begin{bmatrix}2 & 4\\ 3 & 0\\ -1 & 5\end{bmatrix}$

$$A\cdot A^T=\begin{bmatrix}2 & 3 & -1\\ 4 & 0 & 5\end{bmatrix}\cdot\begin{bmatrix}2 & 4\\ 3 & 0\\ -1 & 5\end{bmatrix}$$

$$=\begin{bmatrix}4+9+1 & 8+0-5\\ 8+0-5 & 16+0+25\end{bmatrix}=\begin{bmatrix}14 & 3\\ 3 & 41\end{bmatrix}$$

Yanıt / Answer B

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2. $\begin{bmatrix}-1 & 1\\ 0 & 1\end{bmatrix}\cdot\begin{bmatrix}x & y\\ z & t\end{bmatrix}=\begin{bmatrix}2 & -3\\ 4 & 2\end{bmatrix} \Rightarrow$

$$\begin{bmatrix}-x+z & -y+t\\ 0+z & 0+t\end{bmatrix}=\begin{bmatrix}2 & -3\\ 4 & 2\end{bmatrix}$$

$z=4,\ t=2$

$-x+z=2 \Rightarrow x=2$

$-y+t=-3 \Rightarrow y=5$

$x\cdot y\cdot z\cdot t=2\cdot 5\cdot 4\cdot 2=80$

Yanıt / Answer C

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3. $\begin{bmatrix}a & b\\ c & d\end{bmatrix}\cdot\begin{bmatrix}-1 & 1\\ 2 & 3\end{bmatrix}=\begin{bmatrix}3 & 7\\ 3 & 7\end{bmatrix} \Rightarrow$

$$\begin{bmatrix}-a+2b & a+3b\\ -c+2d & c+3d\end{bmatrix}=\begin{bmatrix}3 & 7\\ 3 & 7\end{bmatrix}$$

$$\left.\begin{aligned}-a+2b&=3\\ a+3b&=7\end{aligned}\right\rangle\ 5b=10 \Rightarrow b=2,\ a=1$$

$$\left.\begin{aligned}-c+2d&=3\\ c+3d&=7\end{aligned}\right\rangle\ 5d=10 \Rightarrow d=2,\ c=1$$

$a+b+c+d=2+2+1+1=6$

Yanıt / Answer A

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4. $A=\begin{bmatrix}a & 3\\ 1 & 2\end{bmatrix} \Rightarrow A^T=\begin{bmatrix}a & 1\\ 3 & 2\end{bmatrix}$

$$A\cdot A^T=\begin{bmatrix}a & 3\\ 1 & 2\end{bmatrix}\cdot\begin{bmatrix}a & 1\\ 3 & 2\end{bmatrix}=\begin{bmatrix}a^2+9 & a+6\\ a+6 & 1+4\end{bmatrix}$$

$$\begin{bmatrix}18 & 9\\ 9 & 5\end{bmatrix}=\begin{bmatrix}a^2+9 & a+6\\ a+6 & 5\end{bmatrix}$$

$a+6=9 \Rightarrow a=3$

Yanıt / Answer D

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5. $\begin{bmatrix}5 & 3\\ 3 & 2\end{bmatrix}\cdot A-\begin{bmatrix}2 & 4\\ 3 & 2\end{bmatrix}=\begin{bmatrix}0 & 1\\ -2 & 2\end{bmatrix}$

$$\begin{bmatrix}5 & 3\\ 3 & 2\end{bmatrix}\cdot A=\begin{bmatrix}0 & 1\\ -2 & 2\end{bmatrix}+\begin{bmatrix}2 & 4\\ 3 & 2\end{bmatrix}$$

$$\begin{bmatrix}5 & 3\\ 3 & 2\end{bmatrix}\cdot\begin{bmatrix}a & b\\ c & d\end{bmatrix}=\begin{bmatrix}2 & 5\\ 1 & 4\end{bmatrix}$$

$$\begin{bmatrix}5a+3c & 5b+3d\\ 3a+2c & 3b+2d\end{bmatrix}=\begin{bmatrix}2 & 5\\ 1 & 4\end{bmatrix}$$

$a=1,\quad b=-2,\quad c=-1,\quad d=5$

$$A=\begin{bmatrix}1 & -2\\ -1 & 5\end{bmatrix}$$

Yanıt / Answer C

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6. $A^2=\begin{bmatrix}1 & 0\\ 2 & 1\end{bmatrix}\cdot\begin{bmatrix}1 & 0\\ 2 & 1\end{bmatrix}=\begin{bmatrix}1+0 & 0+0\\ 2+2 & 0+1\end{bmatrix}=\begin{bmatrix}1 & 0\\ 4 & 1\end{bmatrix}$

$$A^3=\begin{bmatrix}1 & 0\\ 4 & 1\end{bmatrix}\cdot\begin{bmatrix}1 & 0\\ 2 & 1\end{bmatrix}=\begin{bmatrix}1+0 & 0+0\\ 4+2 & 0+1\end{bmatrix}=\begin{bmatrix}1 & 0\\ 6 & 1\end{bmatrix}$$

$A^3\cdot B=A$

$$\begin{bmatrix}1 & 0\\ 6 & 1\end{bmatrix}\cdot\begin{bmatrix}a & b\\ c & d\end{bmatrix}=\begin{bmatrix}1 & 0\\ 2 & 1\end{bmatrix}=\begin{bmatrix}a+0 & b+0\\ 6a+c & 6b+d\end{bmatrix}=\begin{bmatrix}1 & 0\\ 2 & 1\end{bmatrix}$$

$a=1,\ b=0$

$6a+c=2 \Rightarrow c=-4$

$6b+d=1 \Rightarrow d=1$

Yanıt / Answer A

7. $\begin{bmatrix}2 & x\\ -1 & y\end{bmatrix}\cdot\begin{bmatrix}2 & -1\\ x & y\end{bmatrix}=\begin{bmatrix}5 & 0\\ 0 & 5\end{bmatrix}$

$$\begin{bmatrix}4+x^2 & -2+xy\\ -2+xy & 1+y^2\end{bmatrix}=\begin{bmatrix}5 & 0\\ 0 & 5\end{bmatrix}$$

$$\begin{array}{c|c} 4+x^2=5 & 1+y^2=5\\ x^2=1 & y^2=4\\ x=\pm 1 & y=\pm 2\end{array}$$

$-2+xy=0 \Rightarrow x=-1,\ y=-2 \Rightarrow x+y=-3$

Yanıt / Answer D

8. $A\cdot B=\begin{bmatrix}3 & 0\\ -1 & 2\end{bmatrix}\cdot\begin{bmatrix}1 & a\\ b & -1\end{bmatrix}$

$$=\begin{bmatrix}3+0 & 3a+0\\ -1+2b & -a-2\end{bmatrix}=\begin{bmatrix}3 & 3a\\ 2b-1 & -a-2\end{bmatrix}$$

$$B\cdot A=\begin{bmatrix}1 & a\\ b & -1\end{bmatrix}\cdot\begin{bmatrix}3 & 0\\ -1 & 2\end{bmatrix}$$

$$=\begin{bmatrix}3-a & 0+2a\\ 3b+1 & 0-2\end{bmatrix}=\begin{bmatrix}3-a & 2a\\ 3b+1 & -2\end{bmatrix}$$

$$\begin{bmatrix}3 & 3a\\ 2b-1 & -a-2\end{bmatrix}=\begin{bmatrix}3-a & 2a\\ 3b+1 & -2\end{bmatrix}$$

$$\begin{array}{c|c} 2b-1=3b+1 & -a-2=-2\\ b=-2 & a=0\end{array}$$

$a\cdot b=(-2)\cdot 0=0$

Yanıt / Answer C

9. $\begin{bmatrix}x & 1\\ -x & y\end{bmatrix}\cdot\begin{bmatrix}5\\ 3\end{bmatrix}=\begin{bmatrix}-2\\ -7\end{bmatrix} \Rightarrow \begin{bmatrix}5x+3\\ -5x+3y\end{bmatrix}=\begin{bmatrix}-2\\ -7\end{bmatrix}$

$$\begin{array}{c|c} 5x+3=-2 & -5x+3y=-7\\ 5x=-5 & 5+7=-3y\\ x=-1 & y=-4\end{array}$$

$x-y=-1+4=3$

Yanıt / Answer D

10. $\begin{bmatrix}2 & -1\\ 0 & 4\end{bmatrix}\cdot\begin{bmatrix}a\\ 1+a^2\end{bmatrix}=\begin{bmatrix}-4\\ b\end{bmatrix} \Rightarrow \begin{bmatrix}2a-1-a^2\\ 0+4+4a^2\end{bmatrix}=\begin{bmatrix}-4\\ b\end{bmatrix}$

$-a^2-1+2a=-4$

$a^2-2a-3=0$

$(a-3)\cdot(a+1)=0 \Rightarrow a_1=3\ ,\ a_2=-1$

$a=3 \Rightarrow b=4+4a^2=4+4\cdot 9=40$

$a=-1 \Rightarrow b=4+4=8$

$\sum b=40+8=48$

Yanıt / Answer D

11. $A^2=\begin{bmatrix}2 & 1\\ -1 & 3\end{bmatrix}\cdot\begin{bmatrix}2 & 1\\ -1 & 3\end{bmatrix}=\begin{bmatrix}4-1 & 2+3\\ -2-3 & -1+9\end{bmatrix}=\begin{bmatrix}3 & 5\\ -5 & 8\end{bmatrix}$

$$B^2=\begin{bmatrix}-1 & 2\\ 3 & -2\end{bmatrix}\cdot\begin{bmatrix}-1 & 2\\ 3 & -2\end{bmatrix}=\begin{bmatrix}1+6 & -2-4\\ -3-6 & 6+4\end{bmatrix}=\begin{bmatrix}7 & -6\\ -9 & 10\end{bmatrix}$$

$$A^2-B^2=\begin{bmatrix}3 & 5\\ -5 & 8\end{bmatrix}-\begin{bmatrix}7 & -6\\ -9 & 10\end{bmatrix}=\begin{bmatrix}3-7 & 5+6\\ -5+9 & 8-10\end{bmatrix}$$

$$=\begin{bmatrix}-4 & 11\\ 4 & -2\end{bmatrix}$$

Yanıt / Answer B

12. $A^2=\begin{bmatrix}1 & 1\\ -1 & 2\end{bmatrix}\cdot\begin{bmatrix}1 & 1\\ -1 & 2\end{bmatrix}=\begin{bmatrix}1-1 & 1+2\\ -1-2 & -1+4\end{bmatrix}=\begin{bmatrix}0 & 3\\ -3 & 3\end{bmatrix}$

$$A^2-3A+3I=\begin{bmatrix}0 & 3\\ -3 & 3\end{bmatrix}+\begin{bmatrix}-3 & -3\\ 3 & -6\end{bmatrix}+\begin{bmatrix}3 & 0\\ 0 & 3\end{bmatrix}$$

$$=\begin{bmatrix}0-3+3 & 3-3+0\\ -3+3+0 & 3-6+3\end{bmatrix}=\begin{bmatrix}0 & 0\\ 0 & 0\end{bmatrix}$$

Yanıt / Answer E

13. $A=\begin{bmatrix}1 & 3\\ 0 & 2\end{bmatrix} \Rightarrow$

$$A^2=\begin{bmatrix}1 & 3\\ 0 & 2\end{bmatrix}\cdot\begin{bmatrix}1 & 3\\ 0 & 2\end{bmatrix}=\begin{bmatrix}1+0 & 3+6\\ 0+0 & 0+4\end{bmatrix}=\begin{bmatrix}1 & 9\\ 0 & 4\end{bmatrix}$$

$$A^3=A^2\cdot A=\begin{bmatrix}1 & 9\\ 0 & 4\end{bmatrix}\cdot\begin{bmatrix}1 & 3\\ 0 & 2\end{bmatrix}$$

$$A^3=\begin{bmatrix}1+0 & 3+18\\ 0+0 & 0+8\end{bmatrix}=\begin{bmatrix}1 & 21\\ 0 & 8\end{bmatrix}$$

Yanıt / Answer D

14. $A=\begin{bmatrix}a & b\\ c & d\end{bmatrix}\ ,\ A\cdot A^{-1}=I$

$$\begin{bmatrix}a & b\\ c & d\end{bmatrix}\cdot\begin{bmatrix}3 & -1\\ -2 & 2\end{bmatrix}=\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix} \Rightarrow$$

$$\begin{array}{c|c} 3a-2b=0 & 3c-2d=0\\ +\ -a+2b=0 & +\ -c+2d=1\\ \hline 2a=1 & 2c=2\\ a=\frac{1}{2}\ ,\ b\frac{1}{4} & c=\frac{1}{2}\ ,\ d=\frac{3}{4}\end{array}$$

$$\Rightarrow A=\begin{bmatrix}1/2 & 1/4\\ 1/2 & 3/4\end{bmatrix}$$

Yanıt / Answer E

1. $A=\begin{bmatrix}2 & 3\\ 0 & -2\end{bmatrix} \Rightarrow A^{2008}=?$

A) I_2 B) $2^{1004}\cdot I_2$ C) $3^{1004}\cdot I_2$
D) $2^{2008}\cdot I_2$ E) $3^{2008}\cdot I_2$

2. $\left.\begin{array}{l} f(x)=x^5-3 \\ A=\begin{bmatrix}2 & -4\\ 1 & -2\end{bmatrix}\end{array}\right\} \Rightarrow f(A)=?$

A) $-4I_2$ B) $-3I_2$ C) $-2I_2$
D) $-I_2$ E) I_2

3. $\left.\begin{array}{l} A=\begin{bmatrix}2 & 2\\ 0 & -1\end{bmatrix} \\ f(x)=x^2+x-2\end{array}\right\} \Rightarrow f(A)=?$

A) $\begin{bmatrix}2 & 2\\ 0 & -2\end{bmatrix}$ B) $\begin{bmatrix}4 & 4\\ 0 & -2\end{bmatrix}$ C) $\begin{bmatrix}4 & 4\\ 0 & -4\end{bmatrix}$
D) $\begin{bmatrix}4 & 4\\ 0 & -1\end{bmatrix}$ E) $\begin{bmatrix}4 & -4\\ 0 & -2\end{bmatrix}$

4. $A=\begin{bmatrix}-1 & 2\\ 1 & 0\end{bmatrix},\ B=\begin{bmatrix}2 & 0\\ 1 & -1\end{bmatrix} \Rightarrow A-A\cdot B^2=?$

A) $\begin{bmatrix}1 & 0\\ -3 & 0\end{bmatrix}$ B) $\begin{bmatrix}1 & 0\\ 3 & 0\end{bmatrix}$ C) $\begin{bmatrix}-1 & 0\\ 3 & 0\end{bmatrix}$
D) $\begin{bmatrix}1 & 1\\ -3 & 1\end{bmatrix}$ E) $\begin{bmatrix}1 & 1\\ 3 & 1\end{bmatrix}$

5. $A=\begin{bmatrix}1 & -2\\ 1 & -1\end{bmatrix} \Rightarrow A^{34}=?$

A) $-2I_2$ B) $-I_2$ C) I_2 D) $2I_2$ E) $3I_2$

6. $A=\begin{bmatrix}1 & -1\\ -1 & 0\end{bmatrix} \Rightarrow A^3=?$

A) $\begin{bmatrix}3 & 2\\ 1 & 2\end{bmatrix}$ B) $\begin{bmatrix}3 & -2\\ -1 & 2\end{bmatrix}$ C) $\begin{bmatrix}3 & -2\\ 2 & 1\end{bmatrix}$
D) $\begin{bmatrix}3 & 1\\ -2 & 1\end{bmatrix}$ E) $\begin{bmatrix}3 & -2\\ -2 & 1\end{bmatrix}$

7. $A=\begin{bmatrix}1 & 1\\ 2 & 2\end{bmatrix} \Rightarrow A^3=?$

A) A B) 3A C) 6A D) 9A E) 27A

8. $\begin{bmatrix}\mathbf{1} & \mathbf{0}\\ \mathbf{2} & \mathbf{-1}\end{bmatrix}^{1998}=?$

A) $\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$ B) $2^{1998}\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$ C) $2^{1998}\begin{bmatrix}1 & 0\\ 2 & 1\end{bmatrix}$
D) $2^{1998}\begin{bmatrix}1 & 0\\ 2 & -1\end{bmatrix}$ E) $\begin{bmatrix}1 & 0\\ 2 & -1\end{bmatrix}$

9. $A=\begin{bmatrix}-2 & 0\\ 0 & -2\end{bmatrix}$

$f(x) = x^6 - 3x^4 + 3x^2 - 1 \Rightarrow \mathbf{f(A) = ?}$

A) $81I_{2\times 2}$ B) $27I_{2\times 2}$ C) $9I_{2\times 2}$ D) $3I_{2\times 2}$ E) $I_{2\times 2}$

10. $A=\begin{bmatrix}4 & 3\\ -2 & 6\end{bmatrix} \Rightarrow \mathbf{A^{-1} = ?}$

A) $\begin{bmatrix}\frac{1}{5} & -\frac{1}{10}\\ \frac{1}{15} & \frac{2}{15}\end{bmatrix}$ B) $\begin{bmatrix}\frac{1}{3} & -\frac{1}{5}\\ \frac{1}{10} & \frac{2}{15}\end{bmatrix}$ C) $\begin{bmatrix}\frac{1}{5} & -\frac{1}{3}\\ \frac{1}{2} & \frac{2}{5}\end{bmatrix}$ D) $\begin{bmatrix}\frac{1}{3} & -\frac{1}{10}\\ \frac{1}{15} & \frac{2}{15}\end{bmatrix}$ E) $\begin{bmatrix}\frac{1}{5} & -\frac{1}{10}\\ -\frac{1}{15} & -\frac{2}{15}\end{bmatrix}$

11. $A=\begin{bmatrix}3 & -2\\ 5 & 4\end{bmatrix} \Rightarrow \mathbf{A^{-1} = ?}$

A) $\frac{1}{22}\begin{bmatrix}4 & 2\\ -5 & 3\end{bmatrix}$ B) $\frac{1}{11}\begin{bmatrix}4 & 2\\ -5 & 3\end{bmatrix}$ C) $\frac{1}{22}\begin{bmatrix}-4 & 2\\ -5 & 3\end{bmatrix}$ D) $\frac{1}{11}\begin{bmatrix}4 & -2\\ 5 & -3\end{bmatrix}$ E) $\frac{1}{22}\begin{bmatrix}1 & 3\\ -2 & 5\end{bmatrix}$

12. $A=\begin{bmatrix}-2 & 3\\ 5 & 6\end{bmatrix} \Rightarrow \mathbf{detA = ?}$

A) –27 B) –17 C) –3 D) 3 E) 27

13. $A=\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix} \Rightarrow \mathbf{A^T + A^{-1} = ?}$

A) $\begin{bmatrix}1 & 3\\ 4 & 2\end{bmatrix}$ B) $\begin{bmatrix}-1 & 4\\ \frac{3}{2} & \frac{5}{2}\end{bmatrix}$ C) $\begin{bmatrix}-1 & 4\\ \frac{7}{2} & \frac{7}{2}\end{bmatrix}$ D) $\begin{bmatrix}1 & 5\\ \frac{5}{2} & \frac{5}{2}\end{bmatrix}$ E) $\begin{bmatrix}-1 & 3\\ \frac{9}{2} & \frac{7}{2}\end{bmatrix}$

14. $A=\begin{bmatrix}2008 & 2009\\ 2006 & 2007\end{bmatrix} \Rightarrow \mathbf{|A| = ?}$

A) 1 B) 2 C) 4 D) 2007 E) 2008

15. $\begin{vmatrix}x & 2\\ -3 & 1\end{vmatrix} = 0 \Rightarrow \mathbf{x = ?}$

A) –8 B) –6 C) –4 D) 4 E) 6

16. $A=\begin{bmatrix}1 & x\\ 1 & y\end{bmatrix},\ B=\begin{bmatrix}y & 1\\ x & 1\end{bmatrix} \Rightarrow \mathbf{|AB| = ?}$

A) $x^2 - y^2$ B) $(x - y)^2$ C) $x - 2y$ D) $2(x + y)^2$ E) $2x + y$

[YTÜ. YÖS 2013]

Yanıtlar (Answers)

1. D	4. A	7. D	10. A	13. C	16. B
2. B	5. B	8. A	11. A	14. B	
3. B	6. E	9. B	12. A	15. B	

1. $$A^2=\begin{bmatrix}2&3\\0&-2\end{bmatrix}\cdot\begin{bmatrix}2&3\\0&-2\end{bmatrix}$$

$$=\begin{bmatrix}4+0&6-6\\0+0&0+4\end{bmatrix}=\begin{bmatrix}4&0\\0&4\end{bmatrix}=4\begin{bmatrix}1&0\\0&1\end{bmatrix}$$

$$(A^2)^{1004}=4^{1004}\cdot I$$

$$A^{2008}=2^{2008}\cdot I$$

Yanıt / Answer D

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2. $$A^2=\begin{bmatrix}2&-4\\1&-2\end{bmatrix}\cdot\begin{bmatrix}2&-4\\1&-2\end{bmatrix}$$

$$A^2=\begin{bmatrix}4-4&-8+8\\2-2&-4+4\end{bmatrix}=\begin{bmatrix}0&0\\0&0\end{bmatrix}$$

$$A^2\cdot A^2=\begin{bmatrix}0&0\\0&0\end{bmatrix}\Rightarrow A^4\cdot A=\begin{bmatrix}0&0\\0&0\end{bmatrix}$$

$$f(A)=A^5-3=0-3\begin{bmatrix}1&0\\0&1\end{bmatrix}=-3I_2$$

Yanıt / Answer B

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3. $$A^2=\begin{bmatrix}2&2\\0&-1\end{bmatrix}\cdot\begin{bmatrix}2&2\\0&-1\end{bmatrix}=\begin{bmatrix}4+0&4-2\\0+0&0+1\end{bmatrix}=\begin{bmatrix}4&2\\0&1\end{bmatrix}$$

$$f(A)=A^2+A-2$$

$$=\begin{bmatrix}4&2\\0&1\end{bmatrix}+\begin{bmatrix}2&2\\0&-1\end{bmatrix}+\begin{bmatrix}-2&0\\0&-2\end{bmatrix}$$

$$=\begin{bmatrix}4+2-2&2+2+0\\0+0+0&1-1-2\end{bmatrix}=\begin{bmatrix}4&4\\0&-2\end{bmatrix}$$

Yanıt / Answer B

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4. $$B^2=\begin{bmatrix}2&0\\1&-1\end{bmatrix}\cdot\begin{bmatrix}2&0\\1&-1\end{bmatrix}=\begin{bmatrix}4+0&0+0\\2-1&0+1\end{bmatrix}=\begin{bmatrix}4&0\\1&1\end{bmatrix}$$

$$A-A\cdot B^2=\begin{bmatrix}-1&2\\1&0\end{bmatrix}-\begin{bmatrix}-1&2\\1&0\end{bmatrix}\cdot\begin{bmatrix}4&0\\1&1\end{bmatrix}$$

$$=\begin{bmatrix}-1&2\\1&0\end{bmatrix}-\begin{bmatrix}-4+2&0+2\\4+0&0+0\end{bmatrix}$$

$$=\begin{bmatrix}-1&2\\1&0\end{bmatrix}-\begin{bmatrix}-2&2\\4&0\end{bmatrix}$$

$$=\begin{bmatrix}-1+2&2-2\\1-4&0-0\end{bmatrix}=\begin{bmatrix}1&0\\-3&0\end{bmatrix}$$

Yanıt / Answer A

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5. $$A^2=\begin{bmatrix}1&-2\\1&-1\end{bmatrix}\cdot\begin{bmatrix}1&-2\\1&-1\end{bmatrix}$$

$$=\begin{bmatrix}1-2&-2+2\\1-1&-2+1\end{bmatrix}=\begin{bmatrix}-1&0\\0&-1\end{bmatrix}=-1\cdot\begin{bmatrix}1&0\\0&1\end{bmatrix}=-1\cdot I_2$$

$$(A^2)^{17}=(-1)^{17}\cdot I_2\Rightarrow A^{34}=-I_2$$

Yanıt / Answer B

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6. $$A^2=\begin{bmatrix}1&-1\\-1&0\end{bmatrix}\cdot\begin{bmatrix}1&-1\\-1&0\end{bmatrix}$$

$$=\begin{bmatrix}1+1&-1+0\\-1+0&1+0\end{bmatrix}=\begin{bmatrix}2&-1\\-1&1\end{bmatrix}$$

$$A^3=\begin{bmatrix}2&-1\\-1&1\end{bmatrix}\cdot\begin{bmatrix}1&-1\\-1&0\end{bmatrix}$$

$$=\begin{bmatrix}2+1&-2+0\\-1-1&1+0\end{bmatrix}=\begin{bmatrix}3&-2\\-2&1\end{bmatrix}$$

Yanıt / Answer E

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7. $$A^2=\begin{bmatrix}1&1\\2&2\end{bmatrix}\cdot\begin{bmatrix}1&1\\2&2\end{bmatrix}=\begin{bmatrix}1+2&1+2\\2+4&2+4\end{bmatrix}=\begin{bmatrix}3&3\\6&6\end{bmatrix}$$

$$A^3=\begin{bmatrix}3&3\\6&6\end{bmatrix}\cdot\begin{bmatrix}1&1\\2&2\end{bmatrix}$$

$$=\begin{bmatrix}3+6&3+6\\6+12&6+12\end{bmatrix}=\begin{bmatrix}9&9\\18&18\end{bmatrix}$$

$$A^3=9\cdot\begin{bmatrix}1&1\\2&2\end{bmatrix}=9A$$

Yanıt / Answer D

---

8. $$A^2=\begin{bmatrix}1&0\\2&-1\end{bmatrix}\cdot\begin{bmatrix}1&0\\2&-1\end{bmatrix}=\begin{bmatrix}1+0&0+0\\2-2&0+1\end{bmatrix}=\begin{bmatrix}1&0\\0&1\end{bmatrix}$$

$$A^2=I_2$$

$$(A^2)^{999}=(I_2)^{999}\Rightarrow A^{1998}=I_2=\begin{bmatrix}1&0\\0&1\end{bmatrix}$$

Yanıt / Answer A

9. $f(x) = x^6 - 1 + 3x^4 + 3x^2$

$$= \left[(x^2)^3 - 1\right] - 3x^2(x^2 - 1)$$

$$= (x^2 - 1)(x^4 + x^2 + 1) - 3x^2(x^2 - 1)$$

$$= (x^2 - 1)(x^4 - 2x^2 + 1)$$

$$= (x^2 - 1)(x^2 - 1)^2 = (x^2 - 1)^3$$

$$A = -2 \cdot \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \Rightarrow A^2 = 4 \cdot \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$f(A) = \left(4 \cdot \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} - \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}\right)^3 = (3I_2)^3 = 27I_2$$

Yanıt / Answer B

---

10. $\det A = \begin{vmatrix} 4 & 3 \\ -2 & 6 \end{vmatrix} = 24 + 6 = 30$

$$A^{-1} = \frac{1}{\det A} \begin{bmatrix} 6 & -3 \\ 2 & 4 \end{bmatrix}$$

$$A^{-1} = \frac{1}{30} \cdot \begin{bmatrix} 6 & -3 \\ 2 & 4 \end{bmatrix}$$

$$= \begin{bmatrix} \frac{1}{5} & -\frac{1}{10} \\ \frac{1}{15} & \frac{2}{15} \end{bmatrix}$$

Yanıt / Answer A

---

11. $\det A = \begin{vmatrix} 3 & -2 \\ 5 & 4 \end{vmatrix} = 12 + 10 = 22$

$$A^{-1} = \frac{1}{\det A} \begin{bmatrix} 4 & 2 \\ -5 & 3 \end{bmatrix}$$

$$A^{-1} = \frac{1}{22} \cdot \begin{bmatrix} 4 & 2 \\ -5 & 3 \end{bmatrix}$$

Yanıt / Answer A

---

12. $A = \begin{bmatrix} -2 & 3 \\ 5 & 6 \end{bmatrix}$

$$\det A = \begin{vmatrix} -2 & 3 \\ 5 & 6 \end{vmatrix} = (-2) \cdot 6 - 3 \cdot 5$$

$$= -12 - 15 = -27$$

Yanıt / Answer A

---

13. $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \Rightarrow A^T = \begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix}$

$\det A = 4 - 6 = -2$

$$A^{-1} = \frac{-1}{2} \cdot \begin{bmatrix} 4 & -2 \\ -3 & 1 \end{bmatrix} = \begin{bmatrix} -2 & 1 \\ \frac{3}{2} & -\frac{1}{2} \end{bmatrix}$$

$$A^T + A^{-1} = \begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix} + \begin{bmatrix} -2 & 1 \\ \frac{3}{2} & -\frac{1}{2} \end{bmatrix}$$

$$= \begin{bmatrix} -1 & 4 \\ 2 + \frac{3}{2} & 4 - \frac{1}{2} \end{bmatrix} = \begin{bmatrix} -1 & 4 \\ \frac{7}{2} & \frac{7}{2} \end{bmatrix}$$

Yanıt / Answer C

---

14. $|A| = \begin{vmatrix} 2008 & 2009 \\ 2006 & 2007 \end{vmatrix} = \begin{vmatrix} a+2 & a+3 \\ a & a+1 \end{vmatrix}$

$2006 = a$	$= (a+2)(a+1) - a(a+3)$
$2007 = a+1$	$= a^2 + 3a + 2 - a^2 - 3a$
$2008 = a+2$	$= 2$
$2009 = a+3$	

Yanıt / Answer B

---

15. $\begin{vmatrix} x & 2 \\ -3 & 1 \end{vmatrix} = 0 \Rightarrow x \cdot 1 - (-3) \cdot 2 = 0$

$$x + 6 = 0$$

$$x = -6$$

Yanıt / Answer B

---

16. $A \cdot B = \begin{bmatrix} 1 & x \\ 1 & y \end{bmatrix} \cdot \begin{bmatrix} y & 1 \\ x & 1 \end{bmatrix} = \begin{bmatrix} y + x^2 & 1 + x \\ y + xy & 1 + y \end{bmatrix}$

$$|A \cdot B| = (y + y^2 + x^2 + x^2y) - (y + xy + 2y + x^2y)$$

$$= x^2 + y^2 - 2xy$$

$$= (x - y)^2$$

Yanıt / Answer B

1. $A=\begin{bmatrix}-2 & 3\\ 4 & 3\end{bmatrix} \Rightarrow |A|^{20}=?$

A) -18^{20} B) -12^{20} C) 0 D) 12^{20} E) 18^{20}

2. $A=\begin{bmatrix}3 & 1\\ 4 & 2\end{bmatrix} \Rightarrow |A|^3+5|A|=?$

A) 16 B) 18 C) 20 D) 22 E) 24

3. $x>0$,

$\begin{vmatrix}x-4 & x\\ 6 & x+4\end{vmatrix}=0 \Rightarrow x=?$

A) 8 B) 7 C) 6 D) 5 E) 4

4. $|A|=\begin{vmatrix}3 & m\\ 1 & -3\end{vmatrix}=-1 \Rightarrow m=?$

A) –9 B) –8 C) –7 D) –6 E) –5

5. $\begin{vmatrix}\log(x+1) & 3\\ 2 & 1\end{vmatrix}=-5 \Rightarrow x=?$

A) 7 B) 8 C) 9 D) 10 E) 11

6. $\begin{vmatrix}\sin 20^\circ & \sin 70^\circ\\ -\cos 20^\circ & \cos 70^\circ\end{vmatrix}=2x-9 \Rightarrow x=?$

A) 1 B) 2 C) 3 D) 4 E) 5

7. $\begin{vmatrix}1 & 3\\ -2 & |x-1|\end{vmatrix}=12 \Rightarrow \text{ÇK(SS)}=?$

A) {–4, 5} B) {–5, 6} C) {–2, 5} D) {–5, 7} E) {–7, 5}

8. $\begin{vmatrix}x+3 & 1\\ 3 & x-3\end{vmatrix}=13 \Rightarrow \text{ÇK(SS)}=?$

A) {–5, 0} B) {–5, 0, 5} C) {0, –5} D) {0, 5} E) {–5, 5}

9. $\begin{vmatrix} \sin 57° & \cos 57° \\ \sin 27° & \cos 27° \end{vmatrix} = x^2 - \frac{7}{2} \Rightarrow \sum x = ?$

A) –4 B) –2 C) 0 D) 2 E) 4

10. $\left.\begin{matrix} \begin{vmatrix} \sin x & \cos x \\ \cos x & \sin x \end{vmatrix} = \frac{\sqrt{3}}{2} \\ 0 < x < \frac{\pi}{2} \end{matrix}\right\} \Rightarrow x = ?$

A) $\frac{5\pi}{12}$ B) $\frac{\pi}{8}$ C) $\frac{\pi}{6}$ D) $\frac{\pi}{4}$ E) $\frac{\pi}{3}$

11. $\begin{vmatrix} 0 & 1 & -1 \\ -1 & 1 & 2 \\ 2 & -1 & a \end{vmatrix} = 8 \Rightarrow a = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

12. $\begin{vmatrix} 2\cos^2 15° & \sin 30° & 1 \\ 2\cos^2 30° & \sin 60° & 1 \\ 1 & 0 & 1 \end{vmatrix} = ?$

A) $\sqrt{3} - \frac{1}{2}$ B) $\frac{1}{2}$ C) $\frac{\sqrt{2}}{2}$

D) $\frac{\sqrt{3}}{2}$ E) $\sqrt{3} + \frac{1}{2}$

13. $\begin{vmatrix} 1 & 1 & 1 \\ x & 2 & 3 \\ x^2 & 4 & 9 \end{vmatrix} = 0 \Rightarrow x_1 \cdot x_2 = ?$

A) 3 B) 4 C) 5 D) 6 E) 7

14. $\begin{vmatrix} 1-x & 1 & 0 \\ 2 & 0 & x \\ -1 & x & 4 \end{vmatrix} = x^3 - 7x \Rightarrow$ **ÇK(SS) = ?**

A) {4} B) {2,4} C) {–3, 2, 4}

D) {1, 4} E) ∅

15. $\begin{vmatrix} x & 2 & x \\ 1 & 2 & 3 \\ x & 3 & x \end{vmatrix} = -8 \Rightarrow x = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

16. $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, $\det(A) = |A| = 5$

$B = \begin{bmatrix} 3a-b & 4b \\ 3c-d & 4d \end{bmatrix}$, **$\det(B) = |B| = ?$**

A) 5 B) 15 C) 20

D) 40 E) 60

[AKDENİZ ÜNV. YÖS 2013]

Yanıtlar (Answers)

1. E	**4. B**	**7. D**	**10. A**	**13. D**	**16. E**
2. B	**5. C**	**8. E**	**11. D**	**14. B**	
3. A	**6. E**	**9. C**	**12. B**	**15. D**	

1. $\det A = \begin{vmatrix} -2 & 3 \\ 4 & 3 \end{vmatrix} = -6-12 = -18$

$|A| = -18$

$\Rightarrow |A|^{20} = (-18)^{20} = 18^{20}$

Yanıt / Answer E

---

2. $A = \begin{bmatrix} 3 & 1 \\ 4 & 2 \end{bmatrix} \Rightarrow$

$|A| = \begin{vmatrix} 3 & 1 \\ 4 & 2 \end{vmatrix} = 3\cdot 2-4 = 6-4 = 2$

$|A|^3 + 5|A| = 2^3 + 5\cdot 2 = 8+10 = 18$

Yanıt / Answer B

---

3. $\begin{vmatrix} x-4 & x \\ 6 & x+4 \end{vmatrix} = 0 \Rightarrow$

$(x-4)\cdot(x+4) - 6\cdot x = 0$

$x^2 - 16 - 6x = 0$

$x^2 - 6x - 16 = 0$

$(x-8)(x+2) = 0 \Rightarrow x = 8\ ,\ x = -2$

Yanıt / Answer A

---

4. $|A| = \begin{vmatrix} 3 & m \\ 1 & -3 \end{vmatrix} = -1 \Rightarrow$

$3\cdot(-3) - m\cdot 1 = -1$

$-9 - m = -1 \Rightarrow m = -8$

Yanıt / Answer B

---

5. $\begin{vmatrix} \log(x+1) & 3 \\ 2 & 1 \end{vmatrix} = -5$

$\log(x+1) - 6 = -5$

$\log_{10}(x+1) = 1$

$x+1 = 10 \Rightarrow x = 9$

Yanıt / Answer C

---

6. $\begin{vmatrix} \sin 20° & \sin 70° \\ -\cos 20° & \cos 70° \end{vmatrix} = 2x-9 \Rightarrow$

$\sin 20°\cdot\cos 70° + \sin 70°\cdot\cos 20° = 2x-9$

$\sin(70°+20°) = 2x-9$

$\sin 90° = 2x-9$

$1 = 2x-9$

$10 = 2x \Rightarrow x = 5$

Yanıt / Answer E

---

7. $\begin{vmatrix} 1 & 3 \\ -2 & |x-1| \end{vmatrix} = 12 \Rightarrow$

$|x-1| + 6 = 12$

$|x-1| = 6$

$x-1 = 6 \qquad x-1 = -6$

$x_1 = 7 \qquad x_2 = -5$

$\text{ÇK(SS)} = \{-5, 7\}$

Yanıt / Answer D

---

8. $\begin{vmatrix} x+3 & 1 \\ 3 & x-3 \end{vmatrix} = 13 \Rightarrow$

$(x+3)(x-3) - 1\cdot 3 = 13$

$x^2 - 9 - 3 = 13$

$x^2 - 12 = 13$

$x^2 = 25 \Rightarrow x = \pm 5$

$\text{ÇK(SS)} = \{-5, 5\}$

Yanıt / Answer E

9. $\begin{vmatrix} \sin 57° & \cos 57° \\ \sin 27° & \cos 27° \end{vmatrix} = x^2 - \dfrac{7}{2}$

$$\sin 57° \cdot \cos 27° - \cos 57° \cdot \sin 27° = x^2 - \frac{7}{2}$$

$$\sin(57° - 27°) = x^2 - \frac{7}{2}$$

$$\sin 30° = x^2 - \frac{7}{2}$$

$$\frac{1}{2} + \frac{7}{2} = x^2$$

$$4 = x^2 \Rightarrow x = \pm 2$$

$$\sum x = -2 + 2 = 0$$

Yanıt / Answer C

10. $\begin{vmatrix} \sin x & \cos x \\ \cos x & \sin x \end{vmatrix} = \dfrac{\sqrt{3}}{2} \Rightarrow$

$$\sin x \cdot \sin x - \cos x \cdot \cos x = \frac{\sqrt{3}}{2}$$

$$\sin^2 x - \cos^2 x = \frac{\sqrt{3}}{2}$$

$$-(\cos^2 x - \sin^2 x) = \frac{\sqrt{3}}{2}$$

$$-\cos 2x = \frac{\sqrt{3}}{2} = \cos 2x = -\frac{\sqrt{3}}{2}$$

$$\cos 2x = \cos \frac{5\pi}{6}$$

$$2x = \frac{5\pi}{6} \Rightarrow x = \frac{5\pi}{12}$$

Yanıt / Answer A

11.

$$\begin{array}{rc|ccc|cl} & & 0 & 1 & -1 & & \\ & & -1 & 1 & 2 & & \\ -2 & = & 2 & -1 & a & = & 0 \\ 0 & = & 0 & 1 & -1 & = & -1 \\ +\ -a & = & -1 & 1 & 2 & = & 4 \\ \hline -a-2 & & & & & & 3 \end{array}$$

$$3 + a + 2 = 8 \Rightarrow a = 3$$

Yanıt / Answer D

12. $\begin{vmatrix} 2\cos^2 15° & \sin 30° & 1 \\ 2\cos^2 30° & \sin 60° & 1 \\ 1 & 0 & 1 \end{vmatrix} = \begin{vmatrix} 1-2\cos^2 15° & \sin 30° & 1 \\ 1-2\cos^2 30° & \sin 60° & 1 \\ 0 & 0 & 1 \end{vmatrix}$

$$= 1 \cdot (-1)^{3+3} \begin{vmatrix} 1-2\cos^2 15° & \sin 30° \\ 1-2\cos^2 30° & \sin 60° \end{vmatrix} + 0 + 0$$

$$= \begin{vmatrix} \cos 30° & \sin 30° \\ \cos 60° & \sin 60° \end{vmatrix} = \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{3}}{2} - \frac{1}{2} \cdot \frac{1}{2} = \frac{3}{4} - \frac{1}{4} = \frac{2}{4} = \frac{1}{2}$$

Yanıt / Answer B

13.

$$\begin{array}{rc|ccc|cl} & & 1 & 1 & 1 & & \\ & & x & 2 & 3 & & \\ 2x^2 & = & x^2 & 4 & 9 & = & 18 \\ 12 & = & 1 & 1 & 1 & = & 4x \\ +\ 9x & = & x & 2 & 3 & = & 3x^2 \\ \hline 2x^2 + 9x + 12 & & & & & & 3x^2 + 4x + 18 \end{array}$$

$$3x^2 + 4x + 18 - 2x^2 - 9x - 12 = 0$$

$$x^2 - 5x + 6 = 0$$

$$x_1 \cdot x_2 = \frac{c}{a} = \frac{6}{1} = 6$$

Yanıt / Answer D

14.

$$\begin{array}{rc|ccc|cl} & & 1-x & 1 & 0 & & \\ & & 2 & 0 & x & & \\ 0 & = & -1 & x & 4 & = & 0 \\ x^2(1-x) & = & 1-x & 1 & 0 & = & 0 \\ +\ 8 & = & 2 & 0 & x & = & -x \\ \hline x^2 - x^3 + 8 & & & & & & -x \end{array}$$

$$x^3 - 7x = -x - x^2 + x^3 - 8$$

$$x^2 - 6x + 8 = 0$$

$$(x - 4)(x - 2) = 0$$

$$x = 4, \ x = 2$$

ÇK(SS) = {2, 4}

Yanıt / Answer B

15.

$$\begin{array}{rc|ccc|cl} & & x & 2 & x & & \\ & & 1 & 2 & 3 & & \\ 2x^2 & = & x & 3 & x & = & 2x^2 \\ 9x & = & x & 2 & x & = & 3x \\ +\ 2x & = & 1 & 2 & 3 & = & 6x \\ \hline 2x^2 + 11x & & & & & & 2x^2 + 9x \end{array}$$

$$2x^2 + 9x - 2x^2 - 11x = -8$$

$$-2x = -8 \Rightarrow x = 4$$

Yanıt / Answer D

16. $ad - bc = 5$

$12ad - 4bd - 12bc + 4bd = ?$

$12(ad - bc) = 12 \cdot 5 = 60$

Yanıt / Answer E

By yos lovers
L

ÖZEL TANIMLI FONKSİYONLAR
SPECIAL DOMAIN FUNCTIONS

BÖLÜM
CHAPTER
4

Özel Tanımlı Fonksiyonlar / Special Domain Functions

Test 1

1. $f(x) = |x - 2| + |3 - x| + x - 1 \Rightarrow$ **$f(5) = ?$**

A) 7 B) 8 C) 9 D) 10 E) 11

2. $x \in R, \ -3 < x < 5$

$\Rightarrow$ **$|x - 5| + |x + 3| = ?$**

A) –8 B) 2x – 2 C) 2x + 2 D) 2x + 8 E) 8

3. $|x + 3| = -2x + 5 \Rightarrow$ **ÇK(SS) = ?**

A) $\{8\}$ B) $\left\{\frac{2}{3}\right\}$ C) $\left\{-\frac{2}{3}\right\}$ D) $\{-8\}$ E) $\left\{\frac{2}{3}, 8\right\}$

4. $\left.\begin{matrix} x \in Z \\ |x+3| > 2 \end{matrix}\right\} \Rightarrow \sum x = ?$

A) 16 B) 15 C) 14 D) 13 E) 12

5. $x \in Z, \ |x - 1| + |x - 2| = 13 \Rightarrow$ **$\sum x = ?$**

A) 3 B) 4 C) 5 D) 6 E) 7

6. $|2x - 3| = 9 \Rightarrow$ **ÇK(SS) = ?**

A) {–3, 4, 5} B) {–3, 6} C) {3} D) {–6} E) {–6, 3}

7. $-4 < x < 0 \Rightarrow$ **$|x + 7| + |x - 3| + x = ?$**

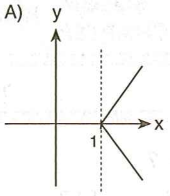
A) 3 – x B) –2x + 3 C) –3x + 3 D) x + 10 E) 4

8. $|x^2 - 3| = 13 \Rightarrow$ **ÇK(SS) = ?**

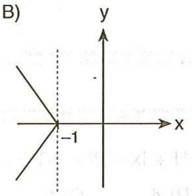
A) {0, 4} B) {4} C) {–3, 0} D) {0, 4} E) {–4, 4}

9. $f(x) = |x - 1| \Rightarrow$ **Grafik(Graph) = ?**

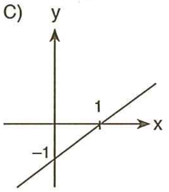
A)



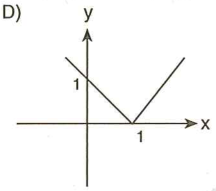
B)



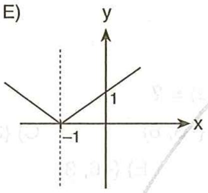
C)



D)

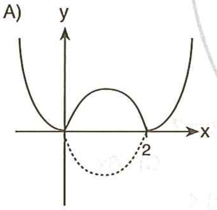


E)

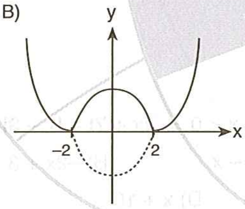


10. $f(x) = |x^2 - 2x| \Rightarrow$ **Grafik(Graph) = ?**

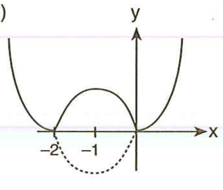
A)



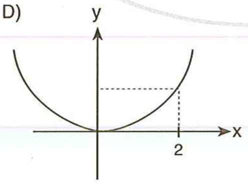
B)



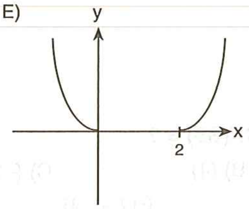
C)



D)

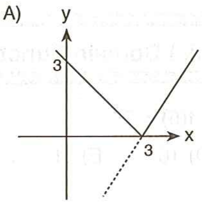


E)

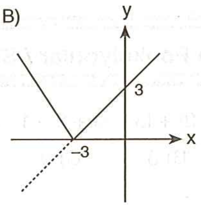


11. $f(x) = \sqrt{x^2 + 6x + 9} \Rightarrow$ **Grafik(Graph) = ?**

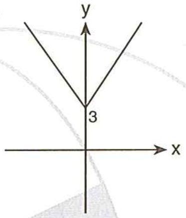
A)



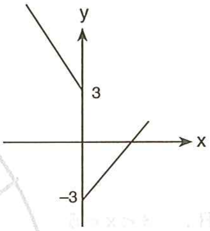
B)



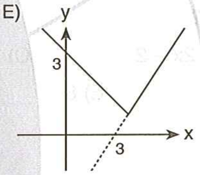
C)



D)



E)



12. $x \in Z$

$|2x - 5| < 7 \Rightarrow \sum x = ?$

A) 10 B) 14 C) 15 D) 17 E) 18

13. $|x - 2| + |x| = 10 \Rightarrow$ **ÇK(SS) = ?**

A) {–4, –2} B) {–4, 2} C) {–4, 4}

D) {–4, 5} E) {–4, 6}

Yanıtlar (Answers)

1. C	4. B	7. D	10. A	13. E
2. E	5. A	8. E	11. B	
3. B	6. B	9. D	12. C	

1. $f(x) = |x - 2| + |3 - x| + x - 1$

$f(5) = |5 - 2| + |3 - 5| + 5 - 1$

$f(5) = 3 + 2 + 4 = 9$

Yanıt / Answer C

2. $-3 < x < 5 \Rightarrow \begin{cases} |x-5| = -x+5 \\ |x+3| = x+3 \end{cases}$

$\Rightarrow |x - 5| + |x + 3| = -x + 5 + x + 3 = 8$

Yanıt / Answer E

3. $|x + 3| = -2x + 5$

$x + 3 = -2x + 5$

$3x = 2$

$x = \frac{2}{3}$

$x + 3 = 2x - 5$

$x = 8$

$-2 \cdot 8 + 5 < 0 \Rightarrow$ ÇK(SS) $= \varnothing$

$\Rightarrow$ ÇK(SS) $= \left\{\frac{2}{3}\right\}$

Yanıt / Answer B

4. $|x + 3| > 2$

$x + 3 > 2$

$x > -1$

$x + 3 < -2$

$x < -5$

$\sum x = \ldots\ldots -7 + -6 + 0 + 1 + 2 + 3 + 4 + 5 + 6 + 7 + \ldots$

$= 15$

Yanıt / Answer B

5.

		1		2	
x − 1	−	○	+		+
x − 2	−		−	○	+
	I.		II.		III.

I. $1 - x + 2 - x = 13 \Rightarrow x = -5$

II. $x - 1 - x + 2 = 13 \Rightarrow 1 = 13$

III. $x - 1 + x - 2 = 13$

$2x - 3 = 13$

$x = 8$

$\sum x = 8 - 5 = 3$

Yanıt / Answer A

6. $|2x - 3| = 9$

$2x - 3 = 9$

$2x = 12$

$x = 6$

$2x - 3 = -9$

$2x = -6$

$x = -3$

ÇK(SS) $= \{-3, 6\}$

Yanıt / Answer B

7. $-4 < x < 0 \Rightarrow \begin{cases} |x+7| = x+7 \\ |x-3| = -x+3 \end{cases}$

$|x+7| + |x-3| + x = x + 7 - x + 3 + x$

$= x + 10$

Yanıt / Answer D

8. $|x^2 - 3| = 13$

$x^2 - 3 = 13$

$x^2 = 16$

$x = \pm 4$

ÇK(SS) = $\{-4, 4\}$

$x^2 - 3 = -13$

$x^2 = -10$

ÇK(SS) = $\varnothing$

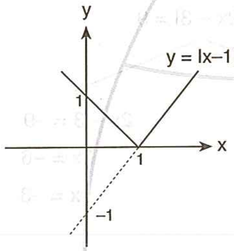
Yanıt / Answer E

9. $y = x - 1$

$x = 0 \Rightarrow y = -1$

$y = 0 \Rightarrow x = 1$

Grafik / *Graph*



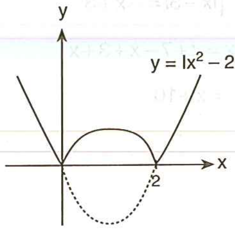
Yanıt / Answer D

10. $y = x^2 - 2x$

$x^2 - 2x = 0$

$x = 0 , x = 2$

Grafik / *Graph*



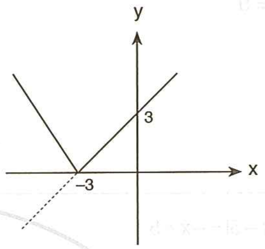
Yanıt / Answer A

11. $f(x) = \sqrt{x^2 + 6x + 9} \Rightarrow y = f(x) = |x + 3|$

$x = 0 \Rightarrow y = 0 + 3 = 3$

$y = 0 \Rightarrow x = -3$

Grafik / *Graph*



Yanıt / Answer B

12. $|2x - 5| < 7$

$-7 < 2x - 5 < 7$

$-2 < 2x < 12$

$-1 < x < 6$

$\sum x = 0 + 1 + 2 + 3 + 4 + 5 = 15$

Yanıt / Answer C

13.

		0		2	
x – 2	–	○	–		+
x	–		+	○	+
	I.		II.		III.

I. $2 - x - x = 10 \Rightarrow = -4$

II. $2 - x + x = 10 \Rightarrow 2 = 10 \Rightarrow$ ÇK(SS) = $\varnothing$

III. $x - 2 + x = 10$

$2x = 12$

$x = 6$

ÇK(SS) = $\{-4, 6\}$

Yanıt / Answer E

1. $f(x) = |x-3| + |x-5| + x$

$\Rightarrow$ **$f(1) + f(3) = ?$**

A) 6 B) 12 C) 14 D) 16 E) 18

2. $|x-3| + x = 2 \Rightarrow$ **ÇK(SS) = ?**

A) $\left\{\frac{5}{2}\right\}$ B) $\left(3, \frac{5}{2}\right]$ C) $\left\{3, \frac{5}{2}\right\}$

D) $\mathbb{R}$ E) $\varnothing$

3. $|x^2 - 5x| = 6 \Rightarrow$ **$\sum x = ?$**

A) 6 B) 9 C) 10 D) 12 E) 18

4. $|x^2 - 1| - 2|x - 1| = 0 \Rightarrow$ **ÇK(SS) = ?**

A) $\{-3, -1\}$ B) $\{-4, -1\}$ C) $\{-3, 1\}$

D) $\{-2, -1\}$ E) $\{1, 3\}$

5. $|x^2 - 3x + 2| = 3|x - 2| \Rightarrow$ **ÇK(SS) = ?**

A) $\{-2, 1, 2\}$ B) $\{-2, 2, 4\}$ C) $\{-2, 1, 4\}$

D) $\{-1, 2, 4\}$ E) $\{1, 2, 4\}$

6. $||x| - 6| = 4 \Rightarrow$ **$\sum x = ?$**

A) –2 B) –1 C) 0 D) 2 E) 3

7. $2 < x < 4 \Rightarrow$ **$|x - |x - 4|| = ?$**

A) 4 B) $x - 2$ C) $x - 4$

D) $2x - 2$ E) $2x - 4$

8. $|x + 1| + |x + 3| = 14 \Rightarrow$ **$\sum x = ?$**

A) –9 B) –6 C) –4 D) 4 E) 6

9. $|x| - 2 = |x - 2| \Rightarrow$ **ÇK(SS) = ?**

A) R B) $\varnothing$ C) $(-\infty, 2]$

D) $[2, \infty)$ E) $[0, 2]$

10. $f(x) = x^2 + |x^2 - 3x| + |x - 2| \Rightarrow$ **$f(-3)$ = ?**

A) 24 B) 28 C) 32 D) 34 E) 36

11. $\big||x - 1| - 5\big| = 5 \Rightarrow$ **ÇK(SS) = ?**

A) $\{-8, 2, 10\}$ B) $\{-9, 1, 11\}$ C) $\{-8, 1, 11\}$

D) $\{-6, 2, 10\}$ E) $\{2, 6, 10\}$

12. $$\left.\begin{array}{l} a > 0, \\ f(x) = |x^2 - ax + 3| + 2, \\ f(3) = 17 \end{array}\right\} \Rightarrow \mathbf{a = ?}$$

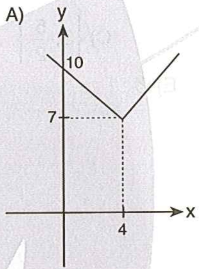
A) 6 B) 7 C) 8 D) 9 E) 12

13. $$\left.\begin{array}{l} a > 0, \\ f(x) = |2x - a| + |x + a| + 3, \\ f(2) = 13 \end{array}\right\} \Rightarrow \mathbf{a = ?}$$

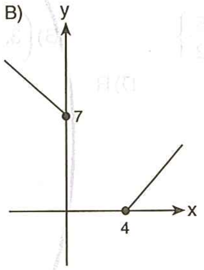
A) 5 B) 6 C) 7 D) 8 E) 9

14. $f(x) = y = |x - 4| + 3 \Rightarrow$ **Grafik(Graph) = ?**

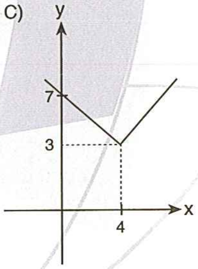
A)



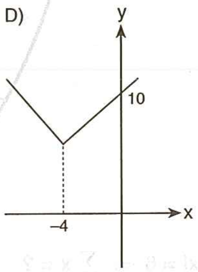
B)



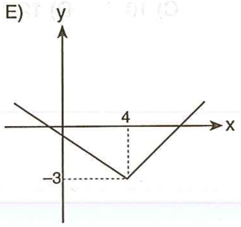
C)



D)



E)



Yanıtlar (Answers)

1. B	4. C	7. E	10. C	13. B
2. E	5. B	8. C	11. B	14. C
3. C	6. C	9. D	12. D	

1. $f(x) = |x-3| + |x-5| + x$

$f(1) = |1-3| + |1-5| + 1$

$= 2 + 4 + 1 = 7$

$f(3) = |3-3| + |3-5| + 3$

$= 0 + 2 + 3 = 5$

$f(1) + f(3) = 7 + 5 = 12$

Yanıt / Answer B

---

2. $|x-3| = 2-x$

$x-3 = 2-x$ $\qquad$ $x-3 = x-2$

$2x = 5$ $\qquad$ $-3 = -2$

$x = \frac{5}{2}$ $\qquad$ $ÇK(SS) = \varnothing$

$2 - \frac{5}{2} < 0 \Rightarrow ÇK(SS) = \varnothing$

Yanıt / Answer E

---

3. $|x^2 - 5x| = 6$

$x^2 - 5x = 6$ $\qquad$ $x^2 - 5x = -6$

$x^2 - 5x - 6 = 0$ $\qquad$ $x^2 - 5x + 6 = 0$

$(x-6)(x+1) = 0$ $\qquad$ $(x-3)(x-2) = 0$

$x = 6,\ x = -1$ $\qquad$ $x = 3,\ x = 2$

$\sum x = -1 + 2 + 3 + 6 = 10$

Yanıt / Answer C

---

4. $|x^2 - 1| - 2|x-1| = 0$

$|x-1| \cdot |x+1| - 2|x-1| = 0$

$|x-1| \cdot (|x+1| - 2) = 0$

$|x-1| = 0$ $\qquad$ $|x+1| - 2 = 0$

$x = 1$ $\qquad$ $|x+1| = 2$

$x + 1 = 2$ $\qquad$ $x + 1 = -2$

$x = 1$ $\qquad$ $x = -3$

$ÇK(SS) = \{-3, 1\}$

Yanıt / Answer C

---

5. $|x^2 - 3x + 2| = 3|x-2|$

$|x-2| \cdot |x-1| - 3|x-2| = 0$

$|x-2| \cdot (|x-1| - 3) = 0$

$|x-2| = 0$ $\qquad$ $|x-1| = 3$

$x = 2$

$x - 1 = 3 \Rightarrow x = 4$ $\qquad$ $x - 1 = -3 \Rightarrow x = -2$

$ÇK(SS) = \{-2, 2, 4\}$

Yanıt / Answer B

---

6. $||x| - 6| = 4$

$|x| - 6 = 4$ $\qquad$ $|x| - 6 = -4$

$|x| = 10$ $\qquad$ $|x| = 2$

$x_1 = 10,\ x_2 = -10$ $\qquad$ $x_3 = 2,\ x_4 = -2$

$\sum x = -10 + 10 + 2 - 2 = 0$

Yanıt / Answer C

---

7. $2 < x < 4 \Rightarrow |x - |x-4||$

$= |x + x - 4|$

$= |2x - 4|$

$= 2x - 4$

Yanıt / Answer E

8.

	I.	-3	II.	-1	III.
$\lvert x+1\rvert$	−		−	○	+
$\lvert x+3\rvert$	−	○	+		+

I. $-x - 1 - x - 3 = 14$

$-2x = 18 \Rightarrow x = -9$

II. $-x - 1 + x + 3 = 14 \Rightarrow 2 = 14 \Rightarrow ÇK(SS) = \varnothing$

III. $x + 1 + x - 3 = 14 \Rightarrow x = 5$

$\sum x = -9 + 5 = -4$

Yanıt / Answer C

9.

x		0		2	
x	−	○	+		+
x − 2	−		−	○	+

I. $x < 0 \Rightarrow -x - 2 = -x + 2$

$-2 \neq 2$

II. $0 \leq x \leq 2 \Rightarrow x - 2 = -x + 2$

$2x = 4$

$x = 2$

III. $x \geq 2 \Rightarrow x - 2 = x - 2$

$-2 = -2$

$ÇK(SS) = [2, \infty)$

Yanıt / Answer D

10. $f(x) = x^2 + |x^2 - 3x| + |x - 2|$

$f(-3) = 9 + |9 + 9| + |-3 - 2|$

$= 9 + 18 + 5 = 32$

Yanıt / Answer C

11. $||x - 1| - 5| = 5$

$|x - 1| - 5 = 5$

$|x - 1| = 10$

$x - 1 = 10 \vee x - 1 = -10$

$x_2 = 11 \vee x_3 = -9$

$|x - 1| - 5 = -5$

$|x - 1| = 0$

$x_1 = 1$

$ÇK(SS) = \{-9, 1, 11\}$

Yanıt / Answer B

12. $f(x) = |x^2 - ax + 3| + 2$

$f(3) = |9 - 3a + 3| + 2$

$|12 - 3a| + 2 = 17$

$|12 - 3a| = 15$

$12 - 3a = 15$

$-3a = 3$

$a = -1$

$12 - 3a = -15$

$27 = 3a$

$a = 9$

$a > 0 \Rightarrow a = 9$

Yanıt / Answer D

13. $f(x) = |2x - a| + |x + a| + 3$

$f(2) = |4 - a| + |2 + a| + 3$

$|a - 4| + |a + 2| + 3 = 13$

$|a - 4| + |a + 2| = 10$

$a > 0 \Rightarrow a + 2 > 0$

$|a - 4| + a + 2 = 10$

$|a - 4| = 8 - a$

$a - 4 = 8 - a$

$2a = 12$

$a = 6$

$a - 4 = a - 8$

$-4 = -8$

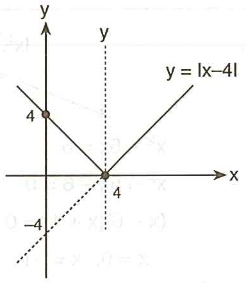
$ÇK(SS) = \varnothing$

Yanıt / Answer B

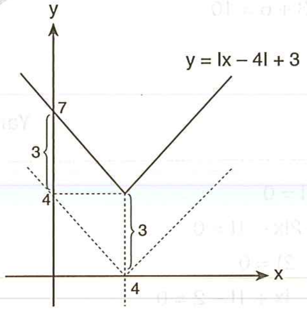
14. $y = x - 4$

$x = 0 \Rightarrow y = 4$

$y = 0 \Rightarrow x = 4$



$y = |x - 4| + 3$



Yanıt / Answer C

1. $|3x - 7| + |6x + 14| = A \Rightarrow$ **$\min(A) = ?$**

A) 7 B) 12 C) 14 D) 20 E) 28

2. $x \in Z, |3x - 5| < 10 \Rightarrow$ **$\sum x = ?$**

A) 6 B) 7 C) 8 D) 9 E) 10

3. $\left.\begin{array}{l} a > 0, \\ f(x) = |x^2 - ax + 2| + 5 \\ f(2) = 13 \end{array}\right\} \Rightarrow$ **$a = ?$**

A) 4 B) 5 C) 6 D) 7 E) 8

4. $|x - 2| + |y - 3| = 0 \Rightarrow$ **$3x + 4y = ?$**

A) 12 B) 16 C) 18 D) 20 E) 24

5. $|x| + |x + 4| = 16 \Rightarrow$ **ÇK(SS) = ?**

A) $\{-10, 6\}$ B) $\{-10, 2\}$ C) $\{-10, 1\}$ D) $\{-2, 10\}$ E) $\{2, 10\}$

6. $\left.\begin{array}{l} f(x) = a|x - 2| + |x + 1| + 1 \\ f(4) = 18 \end{array}\right\} \Rightarrow$ **$a = ?$**

A) 4 B) 5 C) 6 D) 7 E) 8

7. $a, b \in R$,

$0 < a < b$,

$f(x) = |x - a| + |x - b| + |x + a| \Rightarrow$ **$f(b) = ?$**

A) $-a$ B) $-b$ C) $a - b$ D) $2a$ E) $2b$

8. $a < c < b$,

$f(x) = |x - a| + |x - b| + a + b \Rightarrow$ **$f(c) = ?$**

A) $2b$ B) $2a$ C) $2a + b$ D) $2a - 2b$ E) $a - b$

9. $$\left.\begin{array}{l} f(x) = |x^2 - 1| + |x - 2| + ax + 1 \\ f(3) = 19 \end{array}\right\} \Rightarrow \mathbf{a = ?}$$

A) 3 B) 4 C) 5 D) 6 E) 7

10. $x \neq 2$,

$$f(x) = \frac{|x^2 - 4| - 2|x - 2|}{|x - 2|} \Rightarrow \mathbf{f(3) = ?}$$

A) 1 B) 2 C) 3 D) 4 E) 6

11. $A = \sqrt{-x^2 + 6x - 9} + |2x - 1| + 2x \Rightarrow \mathbf{A \in R = ?}$

A) 9 B) 11 C) 13 D) 16 E) 17

12. $$\left.\begin{array}{l} f(x) = 4x - 3, \\ g(x) = |x - 1| + |x - 3| \end{array}\right\} \Rightarrow \mathbf{(fog)(2) = ?}$$

A) 3 B) 4 C) 5 D) 6 E) 7

13. $$\left.\begin{array}{l} (fog)(x) = |2x - 1| + |4x - 2|, \\ g(x) = 2x - 3 \end{array}\right\} \Rightarrow \mathbf{f(2) = ?}$$

A) 12 B) 18 C) 24 D) 26 E) 32

14. $x \neq 3$,

$$f(x) = \frac{|x^2 - 5x + 6| + 3|x - 3|}{|x - 3|} \Rightarrow \mathbf{f(7) = ?}$$

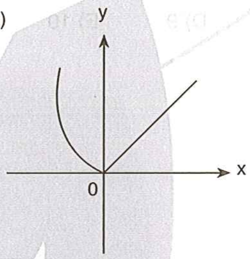
A) 4 B) 5 C) 6 D) 7 E) 8

15. $$f(x) = \begin{cases} x^2 - 1, & x < -1 \\ \dfrac{1}{2}x + \dfrac{1}{2}, & x \geq -1 \end{cases}$$

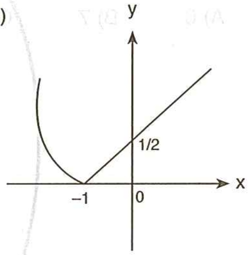
Yukarıdaki fonksiyonun grafiği hangisidir?

Find the graph of f(x)

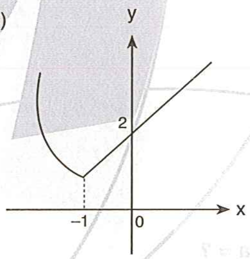
A)



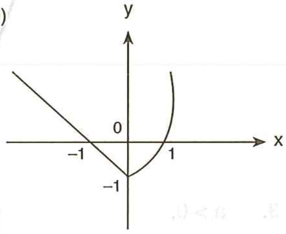
B)



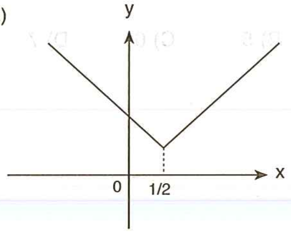
C)



D)



E)



[AKDENİZ ÜNV. YÖS 2013]

Yanıtlar (Answers)

1. C	4. C	7. E	10. C	13. A
2. D	5. A	8. A	11. B	14. E
3. D	6. C	9. A	12. C	15. B

1. $A = |3x - 7| + |6x + 14|$

$6x + 14 = 0 \Rightarrow x = -\frac{7}{3}$

$\min(A) = \left|-3\cdot\frac{7}{3} - 7\right| + \left|-6\cdot\frac{7}{3} + 14\right|$

$\min(A) = |-7-7| + |-14+14|$

$\min(A) = 14$

Yanıt / Answer C

---

2. $|3x - 5| < 10$

$-10 < 3x - 5 < 10$

$-5 < 3x < 15$

$\Rightarrow -\frac{5}{3} < x < 5$

$\sum x = -1 + 0 + 1 + 2 + 3 + 4 = 9$

Yanıt / Answer D

---

3. $f(x) = |x^2 - ax + 2| + 5$

$f(2) = |4 - 2a + 2| + 5$

$13 = |6 - 2a| + 5$

$8 = |6 - 2a|$

$|6 - 2a| = 8$

$\swarrow \quad \searrow$

$6 - 2a = 8$	$6 - 2a = -8$
$-2a = 2$	$14 = 2a$
$a = -1$	$7 = a$

$a > 0 \Rightarrow a \neq -1$

Yanıt / Answer D

---

4. $|x - 2| + |y - 3| = 0$

$x - 2 = 0 \Rightarrow x = 2$

$y - 3 = 0 \Rightarrow y = 3$

$3x + 4y = 3\cdot 2 + 4\cdot 3 = 6 + 12 = 18$

Yanıt / Answer C

5.

		−4		0	
x	−		−	○	+
x + 4	−	○	+		+
	I.		**II.**		**III.**

I. $-x - x - 4 = 16 \Rightarrow x = -10$

II. $-x + x + 4 = 16 \Rightarrow 4 = 16$

III. $x + x + 4 = 16 \Rightarrow x = 6$

ÇK(SS) = {−10, 6}

Yanıt / Answer A

---

6. $f(x) = a|x - 2| + |x + 1| + 1$

$f(4) = a|4 - 2| + |4 + 1| + 1$

$18 = 2a + 6$

$12 = 2a$

$a = 6$

Yanıt / Answer C

---

7. $f(x) = |x - a| + |x - b| + |x + a|$

$f(b) = |b - a| + |b - b| + |b + a|$

$= b - a + 0 + b + a$

$= 2b$

Yanıt / Answer E

---

8. $f(x) = |x - a| + |x - b| + a + b$

$f(c) = |c - a| + |c - b| + a + b$

$= c - a + b - c + a + b$

$= 2b$

Yanıt / Answer A

9. $f(x) = |x^2 - 1| + |x - 2| + ax + 1$

$f(3) = |9 - 1| + |3 - 2| + 3a + 1$

$19 = 8 + 1 + 3a + 1$

$19 = 3a + 10$

$9 = 3a$

$3 = a$

Yanıt / Answer A

---

10. $f(x) = \dfrac{|x^2-4| - 2|x-2|}{|x-2|}$

$f(x) = \dfrac{|x-2| \cdot (|x+2| - 2)}{|x-2|}$

$f(x) = |x+2| - 2$

$f(3) = |3+2| - 2 = 5 - 2 = 3$

Yanıt / Answer C

---

11. $A = \sqrt{-x^2+6x-9} + |2x-1| + 2x$

$-x^2+6x-9 \geq 0 \Rightarrow (x-3)^2 \leq 0$

$\Rightarrow x = 3$

$A = \sqrt{0} + |6-1| + 2 \cdot 3$

$= 5 + 6 = 11$

Yanıt / Answer B

---

12. $(fog)(2) = f[g(2)]$

$g(2) = |2 - 1| + |2 - 3|$

$= 1 + 1 = 2$

$f[g(2)] = f(2)$

$f(2) = 4 \cdot 2 - 3$

$= 8 - 3 = 5$

Yanıt / Answer C

---

13. $g(x) = 2x - 3 \Rightarrow g^{-1}(x) = \dfrac{x+3}{2}$

$f(x) = \left|2 \cdot \dfrac{x+3}{2} - 1\right| + \left|4 \cdot \dfrac{x+3}{2} - 2\right|$

$f(x) = |x+3-1| + |2x+6-2|$

$f(x) = |x+2| + |2x+4|$

$f(2) = |2+2| + |4+4|$

$f(2) = 4 + 8 = 12$

Yanıt / Answer A

---

14. $f(x) = \dfrac{|x-3|\,|x-2| + 3\,|x-3|}{|x-3|}$

$f(x) = \dfrac{|x-3| \cdot (|x-2| + 3)}{|x-3|}$

$f(x) = |x-2| + 3$

$f(7) = |7-2| + 3 = 5 + 3 = 8$

Yanıt / Answer E

---

15. $x < -1$

$y = x^2 - 1$

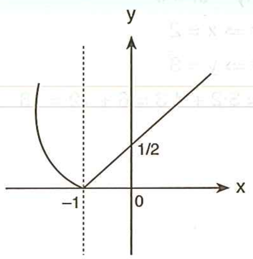
$x = 0$ için(for) $y = 1$

$y = 0$ için(for) $x = -1, x = 1$

$y = \dfrac{1}{2}x + \dfrac{1}{2}$

$x = 0,\ y = \dfrac{1}{2}.$

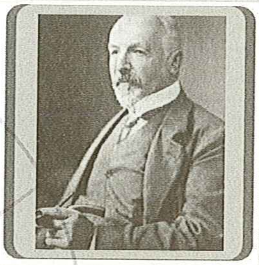
$y = 0,\ x = -1.$

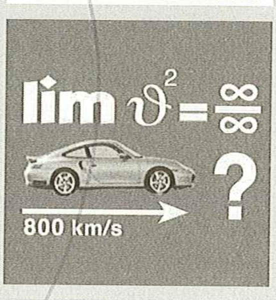


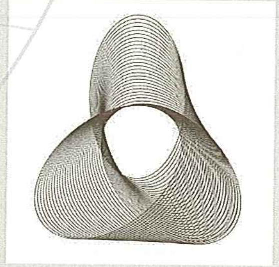
Yanıt / Answer B

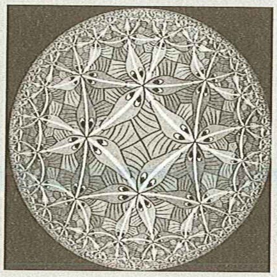
ÜNİTE 9

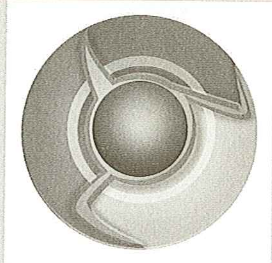
UNIT











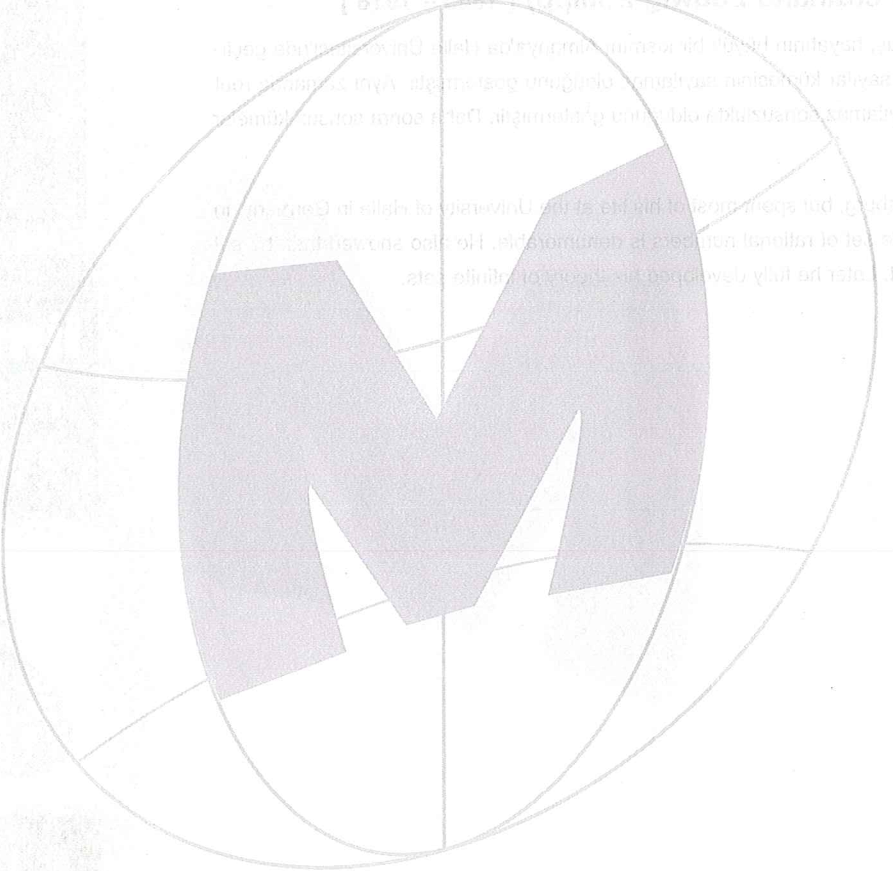
Cantor, Georg (Ferdinand Ludwig Philipp) [1845 – 1918]

St. Petersburg'da doğmuş, hayatının büyük bir kısmını Almanya'da Halle Üniversitesi'nde geçirmiştir. 1873'de rasyonal sayılar kümesinin sayılamaz olduğunu göstermiştir. Aynı zamanda reel sayılar kümesinin de sayılamaz sonsuzlukta olduğunu göstermiştir. Daha sonra sonsuz kümeler kuramını geliştirmiştir.

He was born in St Petersburg, but spent most of his life at the University of Halle in Germany. In 1873, he showed that the set of rational numbers is denumerable. He also showed that the set of all real numbers is not. Later he fully developed his theory of infinite sets.

✓ **LİMİT** .... **391 – 418**
✓ **TÜREV** .... **419 – 466**

✓ LIMITS .... 391 – 418
✓ DERIVATIVE .... 419 – 466



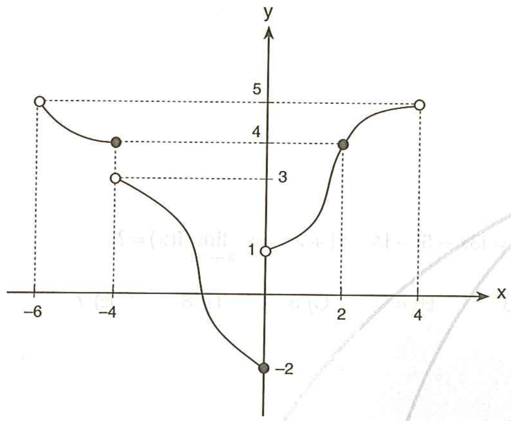
LİMİT
LIMITS

BÖLÜM
CHAPTER
1

Limit / Limits

Test 1

1.



$A=\lim\limits_{x\to -4^+} f(x)+\lim\limits_{x\to -6} f(x)+\lim\limits_{x\to 2} f(x)+\lim\limits_{x\to 0^-} f(x) \Rightarrow \mathbf{A=?}$

A) 4 B) 6 C) 8 D) 10 E) 12

2. $f(x)=\begin{cases} 2+x, & x\geq 2 \\ x^2-3x+4, & x<2 \end{cases}$

$\lim\limits_{x\to 2^-} f(x)+\lim\limits_{x\to 2^+} f(x)=?$

A) 2 B) 4 C) 6 D) 8 E) 10

3. $f(x)=\begin{cases} \sqrt{4x+1}, & x>2 \\ 2x-3, & x=2 \\ x^2-1, & x<2 \end{cases} \Rightarrow \lim\limits_{x\to 2} f(x)=?$

A) 2 B) 3 C) 4 D) 5 E) 6

4. $f(x)=\begin{cases} \dfrac{6}{ax+1}, & x<1 \\ \dfrac{ax}{ax+1}, & x\geq 1 \end{cases}$

$\lim\limits_{x\to 1^-} f(x)=\lim\limits_{x\to 1^+} f(x) \Rightarrow \mathbf{a=?}$

A) 2 B) 3 C) 4 D) 5 E) 6

5. $f(x)=\dfrac{4x+5}{x^2-3x+8} \Rightarrow \lim\limits_{x\to 1} f(x)=?$

A) $\frac{1}{2}$ B) 1 C) $\frac{3}{2}$ D) 2 E) $\frac{5}{2}$

6. $\lim\limits_{x\to 3} \dfrac{x^2-2x+7}{4x-3}=?$

A) $\frac{3}{4}$ B) $\frac{4}{9}$ C) $\frac{5}{9}$ D) $\frac{7}{4}$ E) $\frac{10}{9}$

7. $\lim\limits_{x\to 2} \dfrac{x^3-1}{x^4-x^2}=?$

A) $\frac{5}{12}$ B) $\frac{4}{3}$ C) $\frac{5}{13}$ D) $\frac{7}{12}$ E) $\frac{8}{13}$

8. $\lim\limits_{x\to 2}\left[(x^2-x+3)\cdot(x-1)^2\right]=?$

A) 2 B) 3 C) 4 D) 5 E) 6

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9. $\lim\limits_{x \to 2} \dfrac{3x^2 - 2x + 1}{2x - 1} = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

10. $f(3x-5) = x^2 - 6x + 12 \Rightarrow \lim\limits_{x \to 4} f(x) = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

11. $\lim\limits_{x \to 3} [f(x) + x^2 + 7] = 24 \Rightarrow \lim\limits_{x \to 3} f(x) = ?$

A) 4 B) 5 C) 8 D) 10 E) 12

12. $\lim\limits_{x \to 3} \left[f(x) \cdot (x^3 + 1)\right] = 30 \Rightarrow \lim\limits_{x \to 3} f(x) = ?$

A) $\frac{15}{14}$ B) $\frac{2}{27}$ C) $\frac{31}{15}$ D) $\frac{4}{5}$ E) 3

13. $a > 0,\ f(x) = ax + 3,\ \lim\limits_{x \to 1} (fof)(x) = 31 \Rightarrow a = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

14. $f(x) = |3x - 5| - |4 - x| + 2 \Rightarrow \lim\limits_{x \to -2} f(x) = ?$

A) 3 B) 4 C) 5 D) 6 E) 7

15. $f(x) = \dfrac{|x - 2|}{x - 2} \Rightarrow \lim\limits_{x \to 2^-} f(x) = ?$

A) –4 B) –2 C) –1 D) 1 E) 2

16. $f(x) = x^3 + x$

$\Rightarrow \lim\limits_{x \to 1} \dfrac{f(x) - f(1)}{1 - x} = ?$

A) –4 B) –3 C) –2

D) –1 E) 0

[AKDENİZ ÜNV. YÖS 2013]

Yanıtlar / Answers

1. D	4. E	7. D	10. D	13. C	16. A
2. C	5. C	8. D	11. C	14. E	
3. B	6. E	9. C	12. A	15. C	

1.
$$\left.\begin{array}{l}\lim\limits_{x\to -4^+} f(x)=3\\ \lim\limits_{x\to -6} f(x)=5\\ \lim\limits_{x\to 2} f(x)=4\\ \lim\limits_{x\to 0^-} f(x)=-2\end{array}\right\}\Rightarrow A=10$$

Yanıt / Answer D

2.
$$\lim_{x\to 2^+}(2+x)+\lim_{x\to 2^-}(x^2-3x+4)=2+2+4-6+4=6$$

Yanıt / Answer C

3.
$$\left.\begin{array}{l}\lim\limits_{x\to 2^+}\sqrt{4x+1}=\sqrt{9}=3\\ \lim\limits_{x\to 2^-}(x^2-1)=4-1=3\end{array}\right\}\Rightarrow \lim_{x\to 2^+} f(x)=\lim_{x\to 2^-} f(x)=3$$

$$\Rightarrow \lim_{x\to 2} f(x)=3$$

Yanıt / Answer B

4.
$$\lim_{x\to 1^-} f(x)=\lim_{x\to 1^+} f(x)$$

$$\frac{6}{a\cdot 1+1}=\frac{a}{a\cdot 1+1}\Rightarrow a=6$$

Yanıt / Answer E

5.
$$\lim_{x\to 1}\frac{4x+5}{x^2-3x+8}=\frac{4\cdot 1+5}{1-3+8}=\frac{9}{6}=\frac{3}{2}$$

Yanıt / Answer C

6.
$$\lim_{x\to 3}\frac{x^2-2x+7}{4x-3}=\frac{3^2-2\cdot 3+7}{4\cdot 3-3}$$

$$=\frac{9-6+7}{12-3}=\frac{10}{9}$$

Yanıt / Answer E

7.
$$\lim_{x\to 2}\frac{x^3-1}{x^4-x^2}=\frac{2^3-1}{2^4-2^2}=\frac{8-1}{16-4}=\frac{7}{12}$$

Yanıt / Answer D

8.
$$\lim_{x\to 2}[(x^2-x+3)(x-1)^2]=[(4-2+3)(2-1)^2]$$

$$=(5)\cdot 1=5$$

Yanıt / Answer D

9. $\lim\limits_{x\to 2}\dfrac{3x^2-2x+1}{2x-1}=\dfrac{12-4+1}{4-1}=\dfrac{9}{3}=3$

Yanıt / Answer C

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10. $f(3x-5)=x^2-6x+12 \Rightarrow$

$\lim\limits_{x\to 4} f(x)=f(4)$

$3x-5=4 \;\Rightarrow\; x=3$

$f(4)=3^2-6\cdot 3+12 \;=\; 9-18+12=3$

Yanıt / Answer D

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11. $\lim\limits_{x\to 3}[f(x)+x^2+7]=24$

$\lim\limits_{x\to 3} f(x)+\lim\limits_{x\to 3}(x^2+7)=24$

$\lim\limits_{x\to 3} f(x)+9+7=24$

$\lim\limits_{x\to 3} f(x)=8$

Yanıt / Answer C

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12. $\lim\limits_{x\to 3}\left[f(x)\cdot(x^3+1)\right]=30$

$\lim\limits_{x\to 3} f(x)\cdot\lim\limits_{x\to 3}(x^3+1)=30$

$(27+1)\cdot\lim\limits_{x\to 3} f(x)=30$

$\lim\limits_{x\to 3} f(x)=\dfrac{30}{28}=\dfrac{15}{14}$

Yanıt / Answer A

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13. $(f\circ f)(x)=a(ax+3)+3=a^2x+3a+3$

$\Rightarrow \lim\limits_{x\to 1}(f\circ f)(x)=31$

$a^2+3a+3=31$

$a^2+3a-28=0$

$(a+7)\cdot(a-4)=0$

$a=-7 \vee a=4$

$a>0 \Rightarrow a=4$

Yanıt / Answer C

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14. $f(x)=|3x-5|-|4-x|+2$

$\lim\limits_{x\to -2} f(x)=|-6-5|-|4+2|+2$

$=11-6+2=7$

Yanıt / Answer E

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15. $f(x)=\dfrac{|x-2|}{x-2} \Rightarrow \lim\limits_{x\to 2^-}\dfrac{-(x-2)}{x-2}=-1$

Yanıt / Answer C

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16. $\lim\limits_{x\to 1}\dfrac{x^3+x-2}{1-x}=\dfrac{0}{0} \Rightarrow$

$\lim\limits_{x\to 1}\dfrac{3x^2+1}{-1}=\dfrac{4}{-1}=-4$

Yanıt / Answer A

1. $\lim\limits_{x \to 5^+} \dfrac{-3}{x-5} = ?$

A) –3 B) 0 C) 3 D) –∞ E) +∞

2. $\lim\limits_{x \to e^+} \dfrac{x}{1-\ln x} = ?$

A) –∞ B) ∞ C) 0 D) –1 E) 1

3. $f(x)=3^{\frac{1}{x}} \Rightarrow \lim\limits_{x \to \infty} f(x) = ?$

A) –3 B) –1 C) 0 D) 1 E) 3

4. $\lim\limits_{x \to 2^-} \left(5^{\frac{1}{x-2}}\right) = ?$

A) –1 B) 0 C) 1 D) 3 E) 5

5. $\lim\limits_{x \to 0^-} \left(\dfrac{9}{3+5^{\frac{1}{x}}}\right) = ?$

A) 4 B) 3 C) 2 D) 1 E) 0

6. $\lim\limits_{x \to 5^+} \left(\dfrac{1}{3}\right)^{\frac{1}{x-5}} = ?$

A) $-\infty$ B) $-\dfrac{1}{3}$ C) 0 D) $\dfrac{1}{3}$ E) ∞

7. $\lim\limits_{x \to 0^+} \left(3^{\frac{1}{x}} + \dfrac{6}{x}\right) = ?$

A) –∞ B) –1 C) 0 D) 1 E) ∞

8. $\lim\limits_{x \to -\infty} \dfrac{2^{-x}}{2^{x}} = ?$

A) –∞ B) –1 C) 0 D) 1 E) ∞

9. $\lim\limits_{x \to 1} \dfrac{3x-2}{(x-1)^2} = ?$

A) $-\infty$ B) -1 C) $+1$ D) ∞ E) 2

10. $\lim\limits_{x \to -\infty} \left(5^x + 2^{\frac{3}{x}} + 1\right) = ?$

A) 1 B) 2 C) 4 D) 6 E) 8

11. $\lim\limits_{x \to -\infty} \dfrac{7^{\frac{1}{x}} + 5^x - 2}{3^{\frac{1}{x}+1} + 6} = ?$

A) $-\dfrac{1}{12}$ B) $-\dfrac{1}{9}$ C) $-\dfrac{1}{6}$ D) $-\dfrac{1}{4}$ E) $-\dfrac{1}{2}$

12. $\lim\limits_{x \to \infty} \sqrt{16x^2 + 6x + 5} = ?$

A) $-\infty$ B) -4 C) 0 D) 4 E) ∞

13. $\lim\limits_{x \to \infty} \dfrac{3^x + 3^{-x}}{3^x - 3^{-x}} = ?$

A) $-\infty$ B) -1 C) 0 D) 1 E) ∞

14. $\lim\limits_{x \to \infty} \left[\dfrac{2^{x+1} + 3^{x-1}}{2^x + 3^{x+1}}\right] = ?$

A) $\dfrac{2}{3}$ B) $\dfrac{3}{4}$ C) $\dfrac{1}{9}$ D) $\dfrac{1}{3}$ E) $\dfrac{1}{2}$

15. $\lim\limits_{x \to -2^+} \dfrac{x^3 + 8}{|x+2|} = ?$

A) -4 B) 0 C) 4 D) 12 E) 15

16. $\lim\limits_{h \to 0} \dfrac{(h+1)(2h+1)}{\left(\dfrac{h}{h+3}\right)} = ?$

A) 0 B) -1 C) $\dfrac{1}{5}$

D) 2 E) ∞

[YTÜ. YÖS 2013]

Yanıtlar / Answers

1. D	4. B	7. E	10. B	13. D	16. E
2. A	5. B	8. E	11. B	14. C	
3. D	6. C	9. D	12. E	15. D	

1. $\lim\limits_{x\to 5^+} \dfrac{-3}{x-5} = \dfrac{-3}{5^+-5} = \dfrac{-3}{0^+} = -\infty$

Yanıt / Answer D

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2. $\lim\limits_{x\to e^+} \dfrac{x}{1-\ln x}$

$\lim\limits_{x\to e^+} \dfrac{e}{1-\ln e^+} = \dfrac{e}{0^-} = -\infty$

Yanıt / Answer A

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3. $f(x) = 3^{\frac{1}{x}} \Rightarrow \lim\limits_{x\to\infty} f(x) = 3^{\frac{1}{\infty}} = 3^0 = 1$

Yanıt / Answer D

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4. $\lim\limits_{x\to 2^-} \left(5^{\frac{1}{x-2}}\right) = 5^{\frac{1}{2^--2}} = 5^{-\infty} = \dfrac{1}{5^\infty} = \dfrac{1}{\infty} = 0$

Yanıt / Answer B

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5. $\lim\limits_{x\to 0^-} \left(\dfrac{9}{3+5^{\frac{1}{x}}}\right) \Rightarrow \lim\limits_{x\to 0^-} \left(\dfrac{9}{3+5^{\frac{1}{0^-}}}\right) = \dfrac{9}{3} = 3$

Yanıt / Answer B

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6. $\lim\limits_{x\to 5^+} \left(\dfrac{1}{3}\right)^{\frac{1}{x-5}} = \left(\dfrac{1}{3}\right)^{\frac{1}{5^+-5}}$

$= \left(\dfrac{1}{3}\right)^{\infty} = 0$

Yanıt / Answer C

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7. $\lim\limits_{x\to 0^+} \left(3^{\frac{1}{x}} + \dfrac{6}{x}\right) = 3^{\frac{1}{0}} + \dfrac{6}{0}$

$= \infty + \infty = \infty$

Yanıt / Answer E

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8. $\lim\limits_{x\to -\infty} \dfrac{2^{-x}}{2^x} = \lim\limits_{x\to -\infty} \dfrac{1}{2^{2x}}$

$= \dfrac{1}{2^{-\infty}} = \infty$

Yanıt / Answer E

9. $$\lim_{x\to 1}\frac{3x-2}{(x-1)^2}=\frac{3-2}{(1-1)^2}=\frac{1}{0}=\infty$$

Yanıt / Answer D

10. $$\lim_{x\to-\infty}\left(5^x+2^{\frac{3}{x}}+1\right)=\lim_{x\to-\infty}5^x+\lim_{x\to-\infty}2^{\frac{3}{x}}+\lim_{x\to-\infty}1$$

$$=\frac{1}{5^{\infty}}+2^0+1$$

$$=0+1+1=2$$

Yanıt / Answer B

11. $$\lim_{x\to-\infty}\frac{7^{\frac{1}{x}}+5^x-2}{3^{\frac{1}{x}+1}+6}=\frac{7^{\frac{1}{-\infty}}+5^{-\infty}-2}{3^{\frac{1}{-\infty}+1}+6}$$

$$\frac{7^0+0-2}{3^1+6}=\frac{1-2}{9}=-\frac{1}{9}$$

Yanıt / Answer B

12. $$\lim_{x\to\infty}\sqrt{16x^2+6x+5}=\lim_{x\to\infty}4\cdot\sqrt{1+\frac{6}{16x}+\frac{5}{16x^2}}$$

$$=\lim_{x\to\infty}4\cdot\infty=\infty$$

Yanıt / Answer E

13. $$\lim_{x\to\infty}\frac{3^x+3^{-x}}{3^x-3^{-x}}\Rightarrow\lim_{x\to\infty}\frac{3^x\left(1+\frac{1}{3^{2x}}\right)}{3^x\left(1-\frac{1}{3^{2x}}\right)}$$

$$=\lim_{x\to\infty}\frac{1+\frac{1}{3^{2x}}}{1-\frac{1}{3^{2x}}}=\frac{1+0}{1-0}=1$$

Yanıt / Answer D

14. $$\lim_{x\to\infty}\left[\frac{2^{x+1}+3^{x-1}}{2^x+3^{x+1}}\right]=\lim_{x\to\infty}\left[\frac{2\cdot2^x+\frac{3^x}{3}}{2^x+3^x\cdot3}\right]$$

$$=\lim_{x\to\infty}\left[\frac{\left[3^x\left(\left(\frac{2}{3}\right)^x2+\frac{1}{3}\right)\right]}{\left[3^x\left(\left(\frac{2}{3}\right)^x+3\right)\right]}\right]=\lim_{x\to\infty}\frac{\left(\frac{2}{3}\right)^x+\frac{1}{3}}{\left(\frac{2}{3}\right)^x+3}$$

$$=\frac{0+\frac{1}{3}}{0+3}=\frac{1}{9}$$

Yanıt / Answer C

15. $$\lim_{x\to-2^+}\frac{(x+2)\cdot(x^2-2x+4)}{\lvert(x+2)\rvert}=\lim_{x\to-2^+}\frac{(x+2)\cdot(x^2-2x+4)}{(x+2)}$$

$$=(4+4+4)$$

$$=12$$

Yanıt / Answer D

16. $$\lim_{h\to0}\frac{(h+1)(2h+1)}{\left(\frac{h}{h+3}\right)}=\lim_{h\to0}\frac{(h+1)(2h+1)\cdot(h+3)}{h}$$

$$=\frac{(0+1)(0+1)(0+3)}{0}$$

$$=\frac{3}{0}=\infty$$

Yanıt / Answer E

1. $\lim\limits_{x \to 5} \dfrac{\left(\dfrac{2}{x} - \dfrac{2}{5}\right)}{x-5} = ?$

A) $-\dfrac{5}{2}$ B) $-\dfrac{1}{15}$ C) $-\dfrac{2}{25}$ D) $\dfrac{1}{5}$ E) $\dfrac{2}{25}$

2. $\lim\limits_{x \to 2} \dfrac{x^2-4}{x^2-3x+2} = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

3. $\lim\limits_{x \to 1} \dfrac{x^3-1}{x^2-1} = ?$

A) $\dfrac{1}{2}$ B) $\dfrac{3}{2}$ C) $\dfrac{4}{3}$ D) $\dfrac{3}{4}$ E) $\dfrac{2}{3}$

4. $f: R - \{2\} \to R, \quad f(x) = \dfrac{x^2-x-6}{x+2} \Rightarrow \lim\limits_{x \to -2} f(x) = ?$

A) –5 B) –2 C) 0 D) 2 E) 5

5. $\lim\limits_{x \to -3} \dfrac{x^2-9}{x+3} = ?$

A) –6 B) –3 C) 0 D) 3 E) 6

6. $\lim\limits_{x \to 1} \dfrac{x^2+2x-3}{x^2-3x+2} = ?$

A) –6 B) –4 C) –2 D) 1 E) 4

7. $\lim\limits_{x \to 1} \dfrac{2^{2x+1}-8}{2^x-2} = ?$

A) 2 B) 4 C) 6 D) 8 E) 12

8. $\lim\limits_{x \to 0} \dfrac{9^x-1}{27^x-1} = ?$

A) $-\dfrac{1}{3}$ B) 0 C) $\dfrac{1}{3}$ D) 1 E) $\dfrac{2}{3}$

9. $\lim\limits_{x \to 2} \dfrac{\sqrt{2x} - x}{x^2 + x - 6} = ?$

A) $-\dfrac{3}{10}$ B) $-\dfrac{1}{5}$ C) $-\dfrac{1}{10}$ D) $\dfrac{1}{10}$ E) $\dfrac{1}{5}$

10. $\lim\limits_{x \to 1} \dfrac{x^6 - 1}{x^2 - 1} = ?$

A) –1 B) 0 C) 2 D) 3 E) 5

11. $\lim\limits_{x \to 3} \dfrac{x^3 - 3x^2 + 3x - 9}{x^2 - 2x - 3} = ?$

A) 0 B) $\dfrac{1}{3}$ C) 3 D) 4 E) $\dfrac{2}{3}$

12. $\lim\limits_{x \to 1^+} \dfrac{\sqrt{x-1}}{\sqrt{3x+1} - \sqrt{x+3}} = ?$

A) 0 B) 1 C) –1 D) ∞ E) 2

13. $\lim\limits_{y \to x} \dfrac{y^2 - x^2}{y^3 - x^3} = ?$

A) $\dfrac{2}{3x}$ B) $-\dfrac{x}{3}$ C) 0 D) $\dfrac{x}{3}$ E) $\dfrac{2}{3x}$

14. $\lim\limits_{y \to x} \left(\dfrac{\sqrt{x} - \sqrt{y}}{y - x} \right) = ?$

A) $-\dfrac{1}{2\sqrt{x}}$ B) $-\dfrac{1}{\sqrt{x}}$ C) 0 D) $\dfrac{1}{\sqrt{x}}$ E) $\dfrac{1}{2\sqrt{x}}$

15. $\lim\limits_{x \to 2} \dfrac{x^3 - ax + 8}{x - 2} = 4 \Rightarrow a = ?$

A) –6 B) –3 C) 0 D) 6 E) 8

16. $\lim\limits_{x \to \frac{\pi}{3}} \dfrac{2\sin x - 1}{\sqrt{3} - 2\cos x} = ?$

A) –1 B) 0 C) $\dfrac{1}{4}$

D) $\dfrac{\sqrt{3}}{4}$ E) 1

[MARMARA ÜNV. YÖS 2013]

Yanıtlar / Answers

1. C	4. A	7. D	10. D	13. A	16. E
2. C	5. A	8. E	11. C	14. A	
3. B	6. B	9. C	12. D	15. E	

1. $$\lim_{x\to 5}\frac{\left(\frac{2}{x}-\frac{2}{5}\right)}{x-5}\left(\frac{0}{0}\right)\Rightarrow$$

$$\lim_{x\to 5}\frac{10-2x}{5x(x-5)}=\lim_{x\to 5}\frac{-2(x-5)}{5x(x-5)}$$

$$=\lim_{x\to 5}-\frac{2}{5x}$$

$$=-\frac{2}{25}$$

Yanıt / Answer C

2. $$\lim_{x\to 2}\frac{x^2-4}{x^2-3x+2}\left(\frac{0}{0}\right)\Rightarrow$$

$$\lim_{x\to 2}\frac{(x-2)\cdot(x+2)}{(x-2)\cdot(x-1)}=\lim_{x\to 2}\frac{x+2}{x-1}=\frac{2+2}{2-1}=4$$

Yanıt / Answer C

3. $$\lim_{x\to 1}\frac{x^3-1}{x^2-1}\left(\frac{0}{0}\right)\Rightarrow$$

$$\lim_{x\to 1}\frac{(x-1)(x^2+x+1)}{(x-1)(x+1)}=\lim_{x\to 1}\frac{(x^2+x+1)}{(x+1)}$$

$$=\frac{1+1+1}{1+1}=\frac{3}{2}$$

Yanıt / Answer B

4. $$f(x)=\frac{x^2-x-6}{x+2}\Rightarrow$$

$$\lim_{x\to -2}\frac{(x+2)(x-3)}{x+2}=\lim_{x\to -2}(x-3)$$

$$=-2-3=-5$$

Yanıt / Answer A

5. $$\lim_{x\to -3}\frac{x^2-9}{x+3}=\lim_{x\to -3}\frac{(x-3)(x+3)}{x+3}$$

$$=\lim_{x\to -3}(x-3)=-3-3=-6$$

Yanıt / Answer A

6. $$\lim_{x\to 1}\frac{x^2+2x-3}{x^2-3x+2}\left(\frac{0}{0}\right)\Rightarrow$$

$$\lim_{x\to 1}\frac{(x+3)(x-1)}{(x-2)(x-1)}=\lim_{x\to 1}\frac{x+3}{x-2}=\frac{1+3}{1-2}=-4$$

Yanıt / Answer B

7. $$\lim_{x\to 1}\frac{2^{2x+1}-8}{2^x-2}\left(\frac{0}{0}\right)\Rightarrow$$

$$\lim_{x\to 1}\frac{2\cdot 2^{2x}-8}{2^x-2}=\lim_{x\to 1}\frac{2\cdot(2^{2x}-4)}{2^x-2}$$

$$=2\lim_{x\to 1}\frac{(2^x-2)\cdot(2^x+2)}{2^x-2}=2\lim_{x\to 1}(2^x+2)$$

$$=2\cdot(2^1+2)=2\cdot 4=8$$

Yanıt / Answer D

8. $$\lim_{x\to 0}\frac{9^x-1}{27^x-1}\left(\frac{0}{0}\right)\Rightarrow\lim_{x\to 0}\frac{(3^x-1)\cdot(3^x+1)}{(3^x-1)\cdot(9^x+3^x+1)}$$

$$=\lim_{x\to 0}\frac{3^x+1}{9^x+3^x+1}=\frac{3^0+1}{9^0+3^0+1}=\frac{1+1}{1+1+1}=\frac{2}{3}$$

Yanıt / Answer E

9. $\lim\limits_{x\to 2}\dfrac{\sqrt{2x}-x}{(x+3)(x-2)}\left(\dfrac{0}{0}\right)\Rightarrow$

$$\lim_{x\to 2}\frac{(\sqrt{2x}-x)(\sqrt{2x}+x)}{(x+3)(x-2)(\sqrt{2x}+x)}$$

$$=\lim_{x\to 2}\frac{2x-x^2}{(x+3)(x-2)(\sqrt{2x}+x)}$$

$$=\lim_{x\to 2}\frac{-x(x-2)}{(x+3)(x-2)(\sqrt{2x}+x)}$$

$$=\lim_{x\to 2}\frac{-x}{(x+3)(\sqrt{2x}+x)}$$

$$=\frac{-2}{5(\sqrt{4}+2)}=\frac{-2}{5\cdot 4}=-\frac{1}{10}$$

Yanıt / Answer C

10. $\lim\limits_{x\to 1}\dfrac{x^6-1}{x^2-1}\left(\dfrac{0}{0}\right)\Rightarrow\lim\limits_{x\to 1}\dfrac{(x^3-1)\cdot(x^3+1)}{(x-1)\cdot(x+1)}$

$$=\lim_{x\to 1}\frac{(x-1)\cdot(x^2+x+1)\cdot(x+1)\cdot(x^2-x+1)}{(x-1)\cdot(x+1)}$$

$$=\lim_{x\to 1}(x^2+x+1)\cdot(x^2-x+1)$$

$$=(1+1+1)\cdot(1-1+1)=3\cdot 1=3$$

Yanıt / Answer D

11. $\lim\limits_{x\to 3}\dfrac{x^3-3x^2+3x-9}{x^2-2x-3}\left(\dfrac{0}{0}\right)\Rightarrow\lim\limits_{x\to 3}\dfrac{x^2(x-3)+3(x-3)}{(x+1)(x-3)}$

$$\lim_{x\to 3}\frac{(x-3)(x^2+3)}{(x+1)(x-3)}=\lim_{x\to 3}\frac{x^2+3}{x+1}=\frac{9+3}{3+1}=\frac{12}{4}=3$$

Yanıt / Answer C

12. $\lim\limits_{x\to 1^+}\dfrac{\sqrt{x-1}}{\sqrt{3x+1}-\sqrt{x+3}}\left(\dfrac{0}{0}\right)\Rightarrow$

$$\lim_{x\to 1}\frac{\sqrt{x-1}\cdot\left(\sqrt{3x+1}+\sqrt{x+3}\right)}{\left(\sqrt{3x+1}-\sqrt{x+3}\right)\cdot\left(\sqrt{3x+1}+\sqrt{x+3}\right)}$$

$$=\lim_{x\to 1}\frac{\sqrt{x-1}\cdot\left(\sqrt{3x+1}+\sqrt{x+3}\right)}{3x+1-x-3}$$

$$=\lim_{x\to 1}\frac{\sqrt{x-1}\cdot\left(\sqrt{3x+1}+\sqrt{x+3}\right)}{2(x-1)}$$

$$=\lim_{x\to 1}\frac{\sqrt{3x+1}+\sqrt{x+3}}{2\sqrt{x-1}}\Rightarrow\frac{2+2}{2\sqrt{0}}=\frac{2}{0}=\infty$$

Yanıt / Answer D

13. $\lim\limits_{y\to x}\dfrac{y^2-x^2}{y^3-x^3}\left(\dfrac{0}{0}\right)\Rightarrow$

$$\lim_{y\to x}\frac{(y-x)(y+x)}{(y-x)(y^2+xy+y^2)}$$

$$=\lim_{y\to x}\frac{y+x}{y^2+xy+y^2}=\frac{2x}{x^2+x^2+x^2}=\frac{2}{3x}$$

Yanıt / Answer A

14. $\lim\limits_{y\to x}\left(\dfrac{\sqrt{x}-\sqrt{y}}{y-x}\right)\left(\dfrac{0}{0}\right)\Rightarrow$

$$\lim_{y\to x}\left(\frac{\left(\sqrt{x}-\sqrt{y}\right)\cdot\left(\sqrt{x}+\sqrt{y}\right)}{(y-x)\cdot\left(\sqrt{x}+\sqrt{y}\right)}\right)$$

$$=\lim_{y\to x}\left(\frac{x-y}{-(x-y)\cdot\left(\sqrt{x}+\sqrt{y}\right)}\right)$$

$$=\lim_{y\to x}\left(\frac{-1}{\left(\sqrt{x}+\sqrt{y}\right)}\right)=-\frac{1}{2\sqrt{x}}$$

Yanıt / Answer A

15. $\lim\limits_{x\to 2}\dfrac{x^3-ax+8}{x-2}=4\Rightarrow$

$x=2\Rightarrow 2^3-2a+8=0$

$8+8=2a$

$a=8$

Yanıt / Answer E

16. $\lim\limits_{x\to\frac{\pi}{3}}\dfrac{2\sin x-1}{\sqrt{3}-2\cos x}=\dfrac{2\cdot\sin\frac{\pi}{3}-1}{\sqrt{3}-2\cos\frac{\pi}{3}}$

$$=\frac{2\cdot\frac{\sqrt{3}}{2}-1}{\sqrt{3}-2\cdot\frac{1}{2}}$$

$$=\frac{\sqrt{3}-1}{\sqrt{3}-1}=1$$

Yanıt / Answer E

1. $\lim\limits_{x \to \frac{\pi}{2}} \dfrac{\cos x + \cos 2x}{\sin 3x} = ?$

A) –2 B) –1 C) 0 D) 1 E) 2

2. $\lim\limits_{x \to \frac{\pi}{3}} \dfrac{\tan x + \cos 2x}{\sin 4x} = ?$

A) $\dfrac{\sqrt{3}-6}{3}$ B) $\dfrac{\sqrt{3}-4}{3}$ C) $\dfrac{\sqrt{3}-6}{2}$

D) $\dfrac{\sqrt{3}-4}{2}$ E) $\dfrac{4-\sqrt{3}}{3}$

3. $\lim\limits_{x \to 0} \left(\dfrac{\sin 2x + 3\tan x}{x} \right) = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

4. $\lim\limits_{x \to 3} \dfrac{\sin(3-x)}{x^2-9} = ?$

A) $-\dfrac{1}{6}$ B) $-\dfrac{1}{3}$ C) 0 D) $\dfrac{1}{3}$ E) $\dfrac{1}{6}$

5. $\lim\limits_{x \to 0} \dfrac{\tan^2 x + \sin x^2}{x^2} = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

6. $\lim\limits_{x \to \infty} \dfrac{\sin\frac{1}{x} \cdot \cos\frac{1}{x}}{\frac{2}{x}} = ?$

A) $\dfrac{1}{4}$ B) $\dfrac{1}{2}$ C) 1 D) 2 E) 4

7. $\lim\limits_{x \to \frac{\pi}{3}} \dfrac{6x-2\pi}{\tan(3x-\pi)} = ?$

A) 3 B) 2 C) 1 D) 0 E) –1

8. $\lim\limits_{x \to \pi} \dfrac{\tan x}{\sin x \cdot \cos x} = ?$

A) –1 B) $-\dfrac{1}{2}$ C) 0 D) 1 E) 2

9. $\lim\limits_{x \to \frac{\pi}{4}} \dfrac{\cos 2x}{\cos x - \sin x} = ?$

A) $-\sqrt{2}$ B) $-\sqrt{3}$ C) 0 D) $\sqrt{3}$ E) $\sqrt{2}$

10. $\lim\limits_{x \to \frac{\pi}{2}} \dfrac{\cos x \cdot \cot x}{1 + \cos 2x} = ?$

A) –1 B) $-\dfrac{1}{2}$ C) $\dfrac{1}{2}$ D) 1 E) 2

11. $\lim\limits_{x \to \pi} \dfrac{\sin x \cdot \sin 2x}{\cos 5x - \cos 3x} = ?$

A) $-\dfrac{1}{4}$ B) $-\dfrac{1}{2}$ C) –1 D) 1 E) 2

12. $\lim\limits_{x \to \frac{\pi}{4}} \dfrac{\sin 2x + \sin 6x}{\sin 4x} = ?$

A) –2 B) –1 C) 0 D) 1 E) 2

13. $\lim\limits_{x \to 0} \dfrac{\cos 3x - 1}{x^2} = ?$

A) $-\dfrac{9}{2}$ B) $-\dfrac{3}{2}$ C) 0 D) $\dfrac{3}{2}$ E) $\dfrac{9}{4}$

14. $\lim\limits_{x \to 0} \left(\dfrac{\tan x - \tan^3 x}{2x} \right) = ?$

A) $\dfrac{1}{2}$ B) $\dfrac{1}{4}$ C) 1 D) 0 E) 2

15. $\lim\limits_{x \to \infty} \dfrac{\sin x}{x} = ?$

A) –4 B) –1 C) 0 D) 1 E) 4

16 $\lim\limits_{x \to 1} \dfrac{x \cdot \sqrt{2x - 1}}{x - 1} = ?$

A) $-\infty$ B) –1 C) 0

D) 1 E) ∞

[ANKARA ÜNV. YÖS 2013]

Yanıtlar / Answers

1. D	4. A	7. B	10. C	13. A	16. E
2. A	5. C	8. D	11. A	14. A	
3. D	6. B	9. E	12. C	15. D	

1.

$$\lim_{x\to\frac{\pi}{2}}\frac{\cos x+\cos 2x}{\sin 3x}=\frac{\cos\frac{\pi}{2}+\cos\pi}{\sin\frac{3\pi}{2}}=\frac{0-1}{-1}=1$$

Yanıt / Answer D

2.

$$\lim_{x\to\frac{\pi}{3}}\frac{\tan x+\cos 2x}{\sin 4x}=\frac{\tan\frac{\pi}{3}+\cos\frac{2\pi}{3}}{\sin\frac{4\pi}{3}}$$

$$=\frac{\sqrt{3}-\frac{1}{2}}{-\frac{\sqrt{3}}{2}}=\frac{2\sqrt{3}-1}{-\sqrt{3}}=\frac{\sqrt{3}-6}{3}$$

Yanıt / Answer A

3.

$$\lim_{x\to 0}\left(\frac{\sin 2x+3\tan x}{x}\right)$$

$$=\lim_{x\to 0}\frac{\sin 2x}{x}+3\cdot\underbrace{\lim_{x\to 0}\frac{\tan x}{x}}$$

$$=\lim_{x\to 0}\frac{2\cdot\sin 2x}{2x}+3=2+3=5$$

Yanıt / Answer D

4.

$$\lim_{x\to 3}\frac{\sin(3-x)}{(x-3)(x+3)}\left(\frac{0}{0}\right)$$

$$\Rightarrow\lim_{x\to 3}\frac{1}{x+3}\cdot\underbrace{\lim_{x\to 3}\frac{\sin(3-x)}{-(3-x)}}_{-1}=\frac{-1}{3+3}=-\frac{1}{6}$$

Yanıt / Answer A

5.

$$\lim_{x\to 0}\frac{\tan^2 x+\sin x^2}{x^2}=\lim_{x\to 0}\frac{\tan^2 x}{x^2}+\lim_{x\to 0}\frac{\sin x^2}{x^2}$$

$$=1+1=2$$

Yanıt / Answer C

6.

$$\lim_{x\to\infty}\frac{\sin\frac{1}{x}\cdot\cos\frac{1}{x}}{\frac{2}{x}}=\lim_{x\to\infty}\frac{\frac{1}{2}\cdot 2\sin\frac{1}{x}\cdot\cos\frac{1}{x}}{\frac{2}{x}}$$

$$=\frac{1}{2}\cdot\underbrace{\lim_{x\to\infty}\frac{\sin\frac{2}{x}}{\frac{2}{x}}}_{1}=\frac{1}{2}\cdot 1=\frac{1}{2}$$

Yanıt / Answer B

7.

$$\lim_{x\to\frac{\pi}{3}}\frac{6x-2\pi}{\tan(3x-\pi)}=2\lim_{x\to\frac{\pi}{3}}\frac{3x-\pi}{\tan(3x-\pi)}=2\cdot 1=2$$

Yanıt / Answer B

8.

$$\lim_{x\to\pi}\frac{\tan x}{\sin x\cdot\cos x}\left(\frac{0}{0}\right)\Rightarrow$$

$$\lim_{x\to\pi}\frac{\frac{\sin x}{\cos x}}{\sin x\cdot\cos x}=\lim_{x\to\pi}\frac{\sin x}{\sin x\cdot\cos x\cdot\cos x}$$

$$=\lim_{x\to\pi}\frac{1}{\cos^2 x}=\frac{1}{\cos^2\pi}=\frac{1}{(-1)^2}=1$$

Yanıt / Answer D

9. $\lim\limits_{x\to\frac{\pi}{4}} \dfrac{\cos 2x}{\cos x-\sin x}\left(\dfrac{0}{0}\right)\Rightarrow$

$$\lim_{x\to\frac{\pi}{4}} \frac{\cos^2 x-\sin^2 x}{\cos x-\sin x}$$

$$=\lim_{x\to\frac{\pi}{4}} \frac{(\cos x+\sin x)\cdot(\cos x-\sin x)}{\cos x-\sin x}$$

$$=\lim_{x\to\frac{\pi}{4}} (\cos x+\sin x)$$

$$=\cos\frac{\pi}{4}+\sin\frac{\pi}{4}=\frac{\sqrt{2}}{2}+\frac{\sqrt{2}}{2}=\sqrt{2}$$

Yanıt / Answer E

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10. $\lim\limits_{x\to\frac{\pi}{2}} \dfrac{\cos x\cdot\cot x}{1+\cos 2x}\left(\dfrac{0}{0}\right)\Rightarrow$

$$\lim_{x\to\frac{\pi}{2}} \frac{\cos x\cdot\dfrac{\cos x}{\sin x}}{1+2\cos^2 x-1}=\lim_{x\to\frac{\pi}{2}} \frac{\cos^2 x}{2\cos^2 x\cdot\sin x}$$

$$=\lim_{x\to\frac{\pi}{2}} \frac{1}{2\sin x}=\frac{1}{2\sin\frac{\pi}{2}}=\frac{1}{2}$$

$$=\frac{1}{2\sin\frac{\pi}{2}}=\frac{1}{2}$$

Yanıt / Answer C

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11. $\lim\limits_{x\to\pi} \dfrac{\sin x\cdot\sin 2x}{\cos 5x-\cos 3x}\left(\dfrac{0}{0}\right)\Rightarrow$

$$\lim_{x\to\pi} \frac{\sin x\cdot\sin 2x}{-2\sin\frac{5x+3x}{2}\cdot\sin\frac{5x-3x}{2}}$$

$$=\lim_{x\to\pi} \frac{\sin x\cdot\sin 2x}{-2\sin 4x\cdot\sin x}=\lim_{x\to\pi} \frac{\sin 2x}{-4\sin 2x\cdot\cos 2x}$$

$$=-\frac{1}{4}\lim_{x\to\pi} \frac{1}{\cos 2x}=-\frac{1}{4}\cdot\frac{1}{\underbrace{\cos 2\pi}_{1}}=-\frac{1}{4}\cdot 1=-\frac{1}{4}$$

Yanıt / Answer A

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12. $\lim\limits_{x\to\frac{\pi}{4}} \dfrac{\sin 2x+\sin 6x}{\sin 4x}\left(\dfrac{0}{0}\right)\Rightarrow$

$$\lim_{x\to\frac{\pi}{4}} \frac{2\sin\frac{6x+2x}{2}\cdot\cos\frac{6x-2x}{2}}{\sin 4x}$$

$$=\lim_{x\to\frac{\pi}{4}} \frac{2\sin 4x\cdot\cos 2x}{\sin 4x}$$

$$=\lim_{x\to\frac{\pi}{4}} (2\cos 2x)=2\cos\frac{\pi}{2}=2\cdot 0=0$$

Yanıt / Answer C

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13. $\lim\limits_{x\to 0} \dfrac{\cos 3x-1}{x^2}\left(\dfrac{0}{0}\right)\Rightarrow \lim\limits_{x\to 0} \dfrac{\cos 3x-\cos 0}{x^2}$

$$=\lim_{x\to 0} \frac{-2\sin\frac{3x+0}{2}\cdot\sin\frac{3x-0}{2}}{x^2}$$

$$=\lim_{x\to 0} \frac{-2\sin^2\frac{3x}{2}}{x^2}=-2\cdot\frac{9}{4}\cdot\lim_{x\to 0} \frac{\sin^2\frac{3x}{2}}{\left(\frac{3x}{2}\right)^2}=-\frac{9}{2}$$

Yanıt / Answer A

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14. $\lim\limits_{x\to 0}\left(\dfrac{\tan x}{2x}\right)-\lim\limits_{x\to 0}\left(\dfrac{\tan^3 x}{2x}\right)$

$$=\frac{1}{2}\lim\frac{\tan x}{x}-\lim_{x\to 0}\frac{x^2}{2}\cdot\lim_{x\to 0}\frac{\tan^3 x}{x^3}=\frac{1}{2}\cdot 1-0=\frac{1}{2}$$

Yanıt / Answer A

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15. $\sin x=m \Rightarrow -1\le m\le 1$

$$\lim_{x\to\infty}\frac{\sin x}{x}=\frac{m}{\infty}=0$$

Yanıt / Answer D

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16. $\lim\limits_{x\to 1}\dfrac{x\cdot\sqrt{2x-1}}{x-1}=\dfrac{1\cdot\sqrt{1}}{0}=\infty$

Yanıt / Answer E

1. $\lim\limits_{x \to -\infty} \dfrac{5x^2-2x+1}{x^2+x-1} = ?$

A) –5 B) –3 C) 0 D) 3 E) 5

2. $\lim\limits_{x \to \infty} \dfrac{6x^2-3x+1}{5-x} = ?$

A) $-\infty$ B) –6 C) 0 D) 6 E) ∞

3. $\lim\limits_{x \to -\infty} \dfrac{3x^5-4x-1}{2x^4+3x+1} = ?$

A) $-\infty$ B) $-\dfrac{3}{2}$ C) 0 D) $\dfrac{3}{2}$ E) ∞

4. $\lim\limits_{x \to \infty} \sin\left(\dfrac{\pi x+4}{3x+8}\right) = ?$

A) $-\dfrac{1}{2}$ B) 0 C) $\dfrac{1}{2}$ D) $\dfrac{\sqrt{3}}{2}$ E) 1

5. $\lim\limits_{x \to \infty} \dfrac{(a-2)x^2+(b+3)x-4}{2x-1} = 4 \Rightarrow a \cdot b = ?$

A) –8 B) –6 C) 4 D) 8 E) 10

6. $f(x) = \dfrac{\sqrt{x^4-3x^3+4x^2}}{2x^2-3x} \Rightarrow \lim\limits_{x \to \infty} 3^{f(x)} = ?$

A) $-\dfrac{1}{3}$ B) $-\dfrac{1}{9}$ C) 9 D) $\dfrac{1}{9}$ E) $\sqrt{3}$

7. $\lim\limits_{x \to \infty} \dfrac{3x^4+5x^2+6x}{7x^2+3x+8} = ?$

A) $\dfrac{7}{3}$ B) $\dfrac{5}{3}$ C) $\dfrac{3}{4}$ D) 0 E) ∞

8. $\lim\limits_{x \to \infty} \dfrac{8x^3+6x^2+4}{7x^3+5x+8} = ?$

A) $\dfrac{8}{7}$ B) $\dfrac{6}{7}$ C) $\dfrac{1}{2}$ D) 0 E) ∞

9. $\lim\limits_{x\to\infty} \dfrac{-15x+7}{3x^2+8}=?$

A) $-\infty$ B) 5 C) $\dfrac{7}{8}$ D) $\dfrac{7}{3}$ E) 0

10. $\lim\limits_{x\to\infty} \dfrac{x^2+7x+8}{5x+3x^2+1}=?$

A) 0 B) $\dfrac{1}{5}$ C) $\dfrac{7}{3}$ D) $\dfrac{1}{3}$ E) ∞

11. $\lim\limits_{x\to-\infty} \dfrac{4x^2-3x+7}{6-x}=?$

A) $-\infty$ B) -4 C) $\dfrac{2}{3}$ D) 0 E) ∞

12. $\lim\limits_{x\to\infty} \dfrac{x+\sqrt{x^2+1}}{2x+1}=?$

A) $\dfrac{3}{2}$ B) 1 C) $\dfrac{1}{2}$ D) 0 E) $-\infty$

13. $\lim\limits_{x\to-\infty} \dfrac{3x+\sqrt{4x^2+2x}}{2x}=?$

A) $\dfrac{3}{2}$ B) 1 C) $\dfrac{1}{2}$ D) 0 E) $-\infty$

14. $\lim\limits_{x\to\infty} \dfrac{\sqrt{4x^2-4x+2}}{\sqrt[3]{x^3+2}}=?$

A) 2 B) 3 C) $\dfrac{3}{4}$ D) $\dfrac{4}{3}$ E) 6

15. $\lim\limits_{x\to\infty} \left[\dfrac{(m-2)x^3+2nx^2-3}{3x^2+1}\right]=10 \Rightarrow m+n=?$

A) 15 B) 17 C) 19 D) 21 E) 23

16. $\lim\limits_{x\to\infty} \dfrac{5-x^2}{x^2-x-2}=?$

A) $\dfrac{2}{3}$ B) -2 C) -1

D) 2 E) 5

[YTÜ. YÖS 2013]

Yanıtlar / Answers					
1. E	4. D	7. E	10. D	13. C	16. C
2. A	5. E	8. A	11. E	14. A	
3. A	6. E	9. E	12. B	15. B	

1.

$$\lim_{x\to-\infty}\frac{5x^2-2x+1}{x^2+x+1}\left(\frac{\infty}{\infty}\right)\Rightarrow$$

$$\lim_{x\to-\infty}\frac{x^2\left(5-\frac{2}{x}+\frac{1}{x^2}\right)}{x^2\left(1+\frac{1}{x}+\frac{1}{x^2}\right)}=\frac{5-0+0}{1+0+0}=5$$

Yanıt / Answer E

2.

$$\lim_{x\to\infty}\frac{6x^2-3x+1}{5-x}\left(\frac{\infty}{\infty}\right)\Rightarrow$$

$$\frac{x^2\left(6-\frac{3}{x}+\frac{1}{x^2}\right)}{x\left(\frac{5}{x}-1\right)}=\infty\cdot\left(\frac{6-0+0}{0-1}\right)=\infty(-6)=-\infty$$

Yanıt / Answer A

3.

$$\lim_{x\to-\infty}\frac{3x^5-4x-1}{2x^4+3x+1}\left(\frac{\infty}{\infty}\right)\Rightarrow$$

$$\lim_{x\to\infty}\frac{x^5\left(3-\frac{4}{x^4}-\frac{1}{x^5}\right)}{x^4\left(2+\frac{3}{x^2}+\frac{1}{x^4}\right)}=-\infty\left(\frac{3-0-0}{2+0+0}\right)$$

$$=-\infty\cdot\frac{3}{2}=-\infty$$

Yanıt / Answer A

4.

$$\lim_{x\to\infty}\sin\left(\frac{\pi x+4}{3x+8}\right)=\sin\lim_{x\to\infty}\frac{x\left(\pi+\frac{4}{x}\right)}{x\left(3+\frac{8}{x}\right)}$$

$$=\sin\left(\frac{\pi+0}{3+0}\right)=\sin\frac{\pi}{3}=\frac{\sqrt{3}}{2}$$

Yanıt / Answer D

5.

$$\lim_{x\to\infty}\frac{(a-2)x^2+(b+3)x-4}{2x-1}=4$$

$$\Rightarrow\begin{cases}a-2=0\ \Rightarrow\ a=2\\ \lim\limits_{x\to\infty}\dfrac{(b+3)x-4}{2x-1}=4\\ \Rightarrow\ \dfrac{b+3}{2}=4\ \Rightarrow\ b+3=8\ \Rightarrow\ b=5\end{cases}$$

$$a\cdot b=2\cdot5=10$$

Yanıt / Answer E

6.

$$\lim_{x\to\infty}3^{f(x)}=3^{\lim\limits_{x\to\infty}f(x)}$$

$$\lim_{x\to\infty}f(x)=\lim_{x\to\infty}\frac{\sqrt{x^4-3x^3+4x^2}}{2x^2-3x}$$

$$=\lim_{x\to\infty}\frac{x^2\sqrt{1-\frac{3}{x}+\frac{4}{x^2}}}{2x^2-3x}=\frac{1}{2}$$

$$\Rightarrow 3^{\lim\limits_{x\to\infty}f(x)}=3^{\frac{1}{2}}=\sqrt{3}$$

Yanıt / Answer E

7.

$$\lim_{x\to\infty}\frac{3x^4+5x^2+6x}{7x^2+3x+8}\left(\frac{\infty}{\infty}\right)\Rightarrow$$

$$\lim_{x\to\infty}\frac{x^4\left[3+\frac{5}{x^2}+\frac{6}{x^3}\right]}{x^2\left[7+\frac{3}{x}+\frac{8}{x^2}\right]}=\infty\cdot\frac{3+0+0}{7+0+0}=\infty\cdot\frac{3}{7}=\infty$$

Yanıt / Answer E

8.

$$\lim_{x\to\infty}\frac{8x^3+6x^2+4}{7x^3+5x+8}\left(\frac{\infty}{\infty}\right)\Rightarrow$$

$$\lim_{x\to\infty}\frac{x^3\left[8+\frac{6}{x}+\frac{4}{x^3}\right]}{x^3\left[7+\frac{5}{x^2}-\frac{8}{x^3}\right]}=\lim_{x\to\infty}\frac{8+\frac{6}{x}+\frac{4}{x^3}}{7+\frac{5}{x^2}-\frac{8}{x^3}}$$

$$=\frac{8+0+0}{7+0+0}=\frac{8}{7}$$

Yanıt / Answer A

9. $\lim\limits_{x\to\infty}\dfrac{-15x+7}{3x^2+8}\left(\dfrac{\infty}{\infty}\right)\Rightarrow$

$$\lim_{x\to\infty}\frac{x\left[-15+\dfrac{7}{x}\right]}{x^2\left[3+\dfrac{8}{x^2}\right]}=\frac{-15+0}{\infty[3+0]}=\frac{-15}{\infty}=0$$

Yanıt / Answer E

10. $\lim\limits_{x\to\infty}\dfrac{x^2+7x+8}{5x+3x^2+1}\left(\dfrac{\infty}{\infty}\right)\Rightarrow$

$$\lim_{x\to\infty}\frac{x^2\left[1+\dfrac{7}{x}+\dfrac{8}{x^2}\right]}{x^2\left[\dfrac{5}{x}+3+\dfrac{1}{x^2}\right]}=\frac{1+0+0}{0+3+0}=\frac{1}{3}$$

Yanıt / Answer D

11. $\lim\limits_{x\to-\infty}\dfrac{4x^2-3x+7}{6-x}\left(\dfrac{\infty}{\infty}\right)\Rightarrow$

$$\lim_{x\to-\infty}\frac{x^2\left[4-\dfrac{3}{x}+\dfrac{7}{x^2}\right]}{x\left[\dfrac{6}{x}-1\right]}=\frac{-\infty[4+0+0]}{0-1}=\infty$$

Yanıt / Answer E

12. $\lim\limits_{x\to\infty}\dfrac{x+\sqrt{x^2+1}}{2x+1}\left(\dfrac{\infty}{\infty}\right)\Rightarrow\lim\limits_{x\to\infty}\dfrac{x+\sqrt{x^2\left(1+\dfrac{1}{x^2}\right)}}{2x+1}$

$$=\lim_{x\to\infty}\frac{x+x\cdot\sqrt{1+\dfrac{1}{x^2}}}{2x+1}=\lim_{x\to\infty}\frac{x\cdot\left[1+\sqrt{1+\dfrac{1}{x^2}}\right]}{x\left[2+\dfrac{1}{x}\right]}$$

$$=\frac{1+\sqrt{1+0}}{2+0}=\frac{2}{2}=1$$

Yanıt / Answer B

13. $\lim\limits_{x\to-\infty}\dfrac{3x+\sqrt{4x^2+2x}}{2x}\left(\dfrac{\infty}{\infty}\right)\Rightarrow$

$$\lim_{x\to-\infty}\frac{3x+\sqrt{x^2\left[4+\dfrac{2}{x}\right]}}{2x}=\lim_{x\to-\infty}\frac{3x-x\cdot\sqrt{4+\dfrac{2}{x}}}{2x}$$

$$=\lim_{x\to-\infty}\frac{x\cdot\left[3-\sqrt{4+\dfrac{2}{x}}\right]}{2x}=\frac{3-\sqrt{4+0}}{2}=\frac{3-2}{2}=\frac{1}{2}$$

Yanıt / Answer C

14. $\lim\limits_{x\to\infty}\dfrac{\sqrt{4x^2-4x+2}}{\sqrt[3]{x^3+2}}\left(\dfrac{\infty}{\infty}\right)\Rightarrow$

$$\lim_{x\to\infty}\frac{2x\cdot\sqrt{1-\dfrac{1}{x}+\dfrac{1}{2x^2}}}{x\cdot\sqrt[3]{1+\dfrac{2}{x^3}}}=\frac{2x\cdot\sqrt{1-0+0}}{x\cdot\sqrt{1+0}}=2$$

Yanıt / Answer A

15. $\lim\limits_{x\to\infty}\left[\dfrac{(m-2)x^3+2nx^2-3}{3x^2+1}\right]=10$

$$\Rightarrow\begin{cases}m-2=0\ \Rightarrow\ m=2\\ \lim\limits_{x\to\infty}\dfrac{2nx^2-3}{3x^2+1}=10\\ \Rightarrow\ \dfrac{2n}{3}=10\ \Rightarrow\ n=15\end{cases}$$

$m+n=2+15=17$

Yanıt / Answer B

16. $\lim\limits_{x\to\infty}\dfrac{5-x^2}{x^2-x-2}=-1$

Yanıt / Answer C

L

1. $\lim\limits_{x\to-\infty}(\sqrt{x^2+x}-\sqrt{x^2-4x+1})=?$

A) $-\frac{7}{2}$ B) $-\frac{5}{2}$ C) $-\frac{3}{2}$ D) $\frac{3}{2}$ E) $\frac{5}{2}$

2. $\lim\limits_{x\to\infty}\left(\sqrt{x^2+8x+1}-x\right)=?$

A) 0 B) 1 C) 2 D) 4 E) 8

3. $\lim\limits_{x\to\infty}\left(\sqrt{x^2+ax+3}-\sqrt{x^2-8x+4}\right)=6 \Rightarrow a=?$

A) 2 B) 3 C) 4 D) 6 E) 8

4. $\lim\limits_{x\to\infty}\left(\sqrt{4x^2-2x}-\sqrt{4x^2+x-2}\right)=?$

A) -4 B) -3 C) -2 D) $-\frac{3}{4}$ E) $-\frac{1}{4}$

5. $\lim\limits_{x\to1}\left[\frac{1}{x-1}-\frac{2}{x^2-1}\right]=?$

A) $-\frac{1}{4}$ B) $-\frac{1}{2}$ C) 0 D) $\frac{1}{2}$ E) $\frac{1}{4}$

6. $\lim\limits_{x\to+\infty}\left(\sqrt{x^2+6x}-\sqrt{x^2-2x}\right)=?$

A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) 1 D) 2 E) 4

7. $\lim\limits_{x\to\infty}(x^2-\sqrt{x^4-4x^2})=?$

A) ∞ B) 0 C) 4 D) 2 E) 1

8. $\lim\limits_{x\to2}\left(\frac{4}{x^2-4}-\frac{2}{x^2-2x}\right)=?$

A) 1 B) $\frac{1}{2}$ C) $\frac{1}{4}$ D) $\frac{1}{16}$ E) ∞

9. $\lim\limits_{x\to\infty}\left(x\cdot\sin\dfrac{3}{x}\right)=?$

A) $-\infty$ B) -3 C) 0 D) 3 E) ∞

10. $\lim\limits_{x\to0^+} 2x\sqrt{1+\dfrac{1}{9x^2}}=?$

A) 6 B) 2 C) $\dfrac{1}{3}$ D) $\dfrac{2}{3}$ E) $\dfrac{2}{9}$

11. $\lim\limits_{x\to3^-}(x-3)\cdot\sqrt{1+\dfrac{9}{(x-3)^2}}=?$

A) $-\infty$ B) -3 C) 0 D) 3 E) ∞

12. $\lim\limits_{x\to0}(x\cdot\cot 4x)=?$

A) $\dfrac{1}{4}$ B) $\dfrac{1}{3}$ C) $\dfrac{1}{2}$ D) 2 E) 4

13. $\lim\limits_{x\to\pi/2}\left(\dfrac{1}{\cos x}-\dfrac{1}{\cot x}\right)=?$

A) -2 B) 0 C) 1 D) 2 E) ∞

14. $\lim\limits_{x\to2}\dfrac{1}{\sqrt{x^2-4}}\cdot\left(\dfrac{1}{x}-\dfrac{1}{2}\right)=?$

A) -2 B) $-\dfrac{1}{2}$ C) 0 D) $\dfrac{1}{2}$ E) 2

15. $\lim\limits_{x\to\infty}\left(2x+3-\sqrt{4x^2-5x-1}\right)=?$

A) $-\dfrac{2}{5}$ B) 0 C) $\dfrac{1}{3}$ D) $\dfrac{3}{7}$ E) $\dfrac{17}{4}$

16. $\lim\limits_{x\to9}\dfrac{9-x}{3-\sqrt{x}}=?$

A) 0 B) 3 C) 6 D) 9 E) ∞

[KTÜ. YÖS 2013]

Yanıtlar / Answers

1. B	4. D	7. D	10. D	13. B	16. C
2. D	5. D	8. C	11. B	14. C	
3. C	6. D	9. D	12. A	15. E	

1. $\lim\limits_{x\to-\infty}\left(\sqrt{x^2+x}-\sqrt{x^2-4x+1}\right)\ (\infty-\infty)\Rightarrow$

$$\lim_{x\to-\infty}\left[\left|x+\frac{1}{2}\right|-\left|x-\frac{4}{2}\right|\right]=\lim_{x\to-\infty}\left(-\frac{1}{2}-x-\frac{4}{2}+x\right)$$

$$=-\left(\frac{1}{2}+2\right)=-\frac{5}{2}$$

Yanıt / Answer B

2. $\lim\limits_{x\to\infty}\left(\sqrt{x^2+8x+1}-x\right)(\infty-\infty)$

$$\Rightarrow\lim_{x\to\infty}\left|x+\frac{8}{2}\right|-x=x+4-x=4$$

Yanıt / Answer D

3. $\lim\limits_{x\to\infty}\left(\sqrt{x^2+ax+3}-\sqrt{x^2-8x+4}\right)=6$

$$\lim_{x\to\infty}\left[\left|x+\frac{a}{2}\right|-\left|x-\frac{8}{2}\right|\right]=6$$

$$\lim_{x\to\infty}\left(x+\frac{a}{2}-x+4\right)=6$$

$$\frac{a}{2}+4=6\ \Rightarrow\ \frac{a}{2}=2\ \Rightarrow\ a=4$$

Yanıt / Answer C

4. $\lim\limits_{x\to\infty}\left(\sqrt{4x^2-2x}-\sqrt{4x^2+x-2}\right)(\infty-\infty)\Rightarrow$

$$\lim_{x\to\infty}\left[2\left|x-\frac{2}{2\cdot4}\right|-2\left|x+\frac{1}{4\cdot2}\right|\right]$$

$$=\lim_{x\to\infty}\left(2x-\frac{1}{2}-2x-\frac{1}{4}\right)$$

$$=-\frac{1}{2}-\frac{1}{4}=-\frac{3}{4}$$

Yanıt / Answer D

5. $\lim\limits_{x\to1}\left[\frac{1}{x-1}-\frac{2}{x^2-1}\right](\infty-\infty)\Rightarrow$

$$\lim_{x\to1}\left(\frac{x+1}{x^2-1}-\frac{2}{x^2-1}\right)=\lim_{x\to1}\left(\frac{x+1-2}{(x-1)(x+1)}\right)$$

$$=\lim_{x\to1}\left(\frac{x-1}{(x-1)(x+1)}\right)$$

$$=\lim_{x\to1}\frac{1}{x+1}=\frac{1}{1+1}=\frac{1}{2}$$

Yanıt / Answer D

6. $\lim\limits_{x\to+\infty}\left(\sqrt{x^2+6x}-\sqrt{x^2-2x}\right)$

$$=\lim_{x\to\infty}\left(\left|x+\frac{6}{2}\right|-\left|x-\frac{2}{2}\right|\right)$$

$$=\lim_{x\to\infty}(x+3-x+1)=4$$

Yanıt / Answer D

7. $\lim\limits_{x\to\infty}\left(x^2-\sqrt{x^4-4x^2}\right)(\infty-\infty)\Rightarrow$

$$\lim_{x\to\infty}\left[x^2-\left|x^2-\frac{4}{2}\right|\right]=\lim_{x\to\infty}[x^2-x^2+2]=2$$

Yanıt / Answer D

8. $\lim\limits_{x\to2}\left(\underset{(x)}{\frac{4}{x^2-4}}-\underset{(x+2)}{\frac{2}{x(x-2)}}\right)(\infty-\infty)\Rightarrow$

$$\lim_{x\to2}\left(\frac{4x-2x-4}{x(x-2)\cdot(x+2)}\right)=\lim_{x\to2}\left(\frac{2(x-2)}{x(x-2)\cdot(x+2)}\right)$$

$$=\lim_{x\to2}\frac{2}{x(x+2)}=\frac{2}{2(2+2)}=\frac{1}{4}$$

Yanıt / Answer C

9. $$\left.\begin{array}{l}\lim\limits_{x\to\infty} x\cdot\sin\dfrac{3}{x}\ (\infty\cdot 0)\\[2ex] \lim\limits_{x\to\infty}\dfrac{\sin\frac{3}{x}}{\frac{1}{x}}\ (\frac{0}{0})\end{array}\right\}\Rightarrow 3\lim\limits_{x\to\infty}\dfrac{\sin\frac{3}{x}}{\frac{3}{x}}=3\cdot 1=3$$

Yanıt / Answer D

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10. $$\lim_{x\to 0^+} 2x\sqrt{1+\frac{1}{9x^2}}\quad (0\cdot\infty)$$

$$\lim_{x\to 0^+} 2x\sqrt{\frac{9x^2+1}{9x^2}}\ (0\cdot\infty)$$

$$\Rightarrow \lim_{x\to 0^+}\frac{2x}{3x}\sqrt{9x^2+1}=\frac{2}{3}\cdot\sqrt{1}=\frac{2}{3}$$

Yanıt / Answer D

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11. $$\lim_{x\to 3^-}(x-3)\cdot\sqrt{1+\frac{9}{(x-3)^2}}\quad (0\cdot\infty)$$

$$=\lim_{x\to 3^-}(x-3)\sqrt{\frac{x^2-6x+9+9}{(x-3)^2}}\quad (0\cdot\infty)$$

$$=\lim_{x\to 3^-}\frac{(x-3)}{|x-3|}\cdot\sqrt{x^2-6x+18}$$

$$=\lim_{x\to 3^-}(-1)\cdot\sqrt{x^2-6x+18}$$

$$=(-1)\cdot\sqrt{9-18+18}=(-1)\cdot 3=-3$$

Yanıt / Answer B

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12. $$\lim_{x\to 0}(x\cdot\cot 4x)\ (0\cdot\infty)$$

$$\lim_{x\to 0}\frac{x}{\frac{1}{\cot 4x}}=\lim_{x\to 0}\frac{x}{\tan 4x}\left(\frac{0}{0}\right)$$

$$=\lim_{x\to 0}\frac{4x}{4\tan 4x}=\frac{1}{4}\cdot\underbrace{\lim_{x\to 0}\frac{4x}{\tan 4x}}_{1}=\frac{1}{4}$$

Yanıt / Answer A

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13. $$\lim_{x\to\pi/2}\left(\frac{1}{\cos x}-\frac{1}{\cot x}\right)\quad(\infty-\infty)$$

$$=\lim_{x\to\pi/2}\left(\frac{1}{\cos x}-\frac{\sin x}{\cos x}\right)(\infty-\infty)$$

$$=\lim_{x\to\pi/2}\frac{1-\sin x}{\cos x}\ (\frac{0}{0})$$

$$=\lim_{x\to\pi/2}\frac{1-\sin x}{\sqrt{1-\sin x}\cdot\sqrt{1+\sin x}}$$

$$=\lim_{x\to\pi/2}\frac{\sqrt{1-\sin x}}{\sqrt{1+\sin x}}=0$$

Yanıt / Answer B

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14. $$\lim_{x\to 2}\frac{1}{\sqrt{x^2-4}}\cdot\left(\frac{1}{x}-\frac{1}{2}\right)\quad(\infty\cdot 0)$$

$$=\lim_{x\to 2}\frac{1}{\sqrt{x^2-4}}\cdot\frac{2-x}{2x}\quad(\infty\cdot 0)$$

$$=\lim_{x\to 2}\frac{2-x}{\sqrt{x^2-4}\cdot 2x}\quad(\frac{0}{0})$$

$$\Rightarrow\lim_{x\to 2}\frac{-\sqrt{2-x}}{\sqrt{x+2}\cdot 2x}=0$$

Yanıt / Answer C

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15. $$\lim_{x\to\infty}\left(2x+3-\sqrt{4x^2-5x-1}\right)\quad(\infty-\infty)$$

$$\Rightarrow\lim_{x\to\infty}\left(2x+3-2\cdot\left|x-\frac{5}{8}\right|\right)=2x+3-2x+\frac{5}{4}$$

$$=\frac{17}{4}$$

Yanıt / Answer E

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16. $$\lim_{x\to 9}\frac{9-x}{3-\sqrt{x}}=\lim_{x\to 9}\frac{(3-\sqrt{x})\cdot(3+\sqrt{x})}{3-\sqrt{x}}$$

$$=\lim_{x\to 9}3+\sqrt{x}$$

$$=3+\sqrt{9}=6$$

Yanıt / Answer C

1. $\lim\limits_{x \to \infty} \left(1+\dfrac{3}{2x+1}\right)^{4x-2} = ?$

A) e^6 B) e^4 C) e^3 D) 1 E) 0

2. $\lim\limits_{x \to \infty} \left(\dfrac{4x+3}{4x-1}\right)^{3x-5} = ?$

A) e^6 B) e^4 C) e^3 D) 1 E) 0

3. $\lim\limits_{x \to \infty} \left(1-\dfrac{4}{3x}\right)^{x} = ?$

A) $e^{-\frac{4}{3}}$ B) $e^{-\frac{2}{3}}$ C) $e^{-\frac{1}{3}}$ D) e^2 E) e^4

4. $\lim\limits_{x \to \infty} \left(1+\dfrac{2}{x}\right)^{3x} = ?$

A) $\sqrt{e}$ B) e C) e^2 D) e^4 E) e^6

5. $\lim\limits_{x \to \infty} \left(\dfrac{x+2}{x}\right)^{2x} = ?$

A) $e^{1/4}$ B) $e^{1/2}$ C) e D) e^2 E) e^4

6. $\lim\limits_{x \to \infty} \left(\dfrac{x+4}{x+1}\right)^{3x-1} = ?$

A) 1 B) e^3 C) e^6 D) e^9 E) e^{12}

7. $\lim\limits_{x \to \infty} \left(\dfrac{4x+1}{4x-5}\right)^{2x} = ?$

A) 2 B) 3 C) $\dfrac{1}{e^2}$ D) e^3 E) $\dfrac{1}{e^6}$

8. $\lim\limits_{x \to \infty} \left(\dfrac{3x^2+4x+1}{3x^2+1}\right)^{4x+1} = ?$

A) e^{13} B) e^{14} C) $e^{\frac{16}{3}}$

D) $e^{\frac{17}{3}}$ E) e^6

9. $\lim\limits_{x \to 0} (1-\tan x)^{\frac{2}{x}} = ?$

A) e^{-2} B) e^{-1} C) 1 D) e E) e^{2}

10. $\lim\limits_{x \to 0} \left(e^{x}+\frac{x}{3}\right)^{\frac{4}{x}} = ?$

A) e B) $e^{\frac{4}{3}}$ C) e^{3} D) e^{4} E) e^{6}

11. $\lim\limits_{x \to 0} \left(e^{x}+2x\right)^{\frac{2}{x}} = ?$

A) e^{2} B) e^{4} C) e^{6} D) e^{9} E) e^{12}

12. $\lim\limits_{x \to 0} \left(\frac{1}{\sin x}-\frac{1}{x}\right) = ?$

A) $-\infty$ B) -1 C) 0 D) 1 E) ∞

13. $\lim\limits_{x \to 0} \left(1-\frac{2x}{3}\right)^{\frac{6}{x}} = ?$

A) e^{-6} B) e^{-4} C) e^{-2} D) e^{3} E) e^{9}

14. $\lim\limits_{x \to \infty} \left(\frac{x^{2}+3x+1}{x^{2}-1}\right)^{2x} = ?$

A) $-e$ B) $-e^{2}$ C) e^{2} D) e^{3} E) e^{6}

15. $\lim\limits_{x \to 0} (1+3x)^{\frac{1}{x}} = ?$

A) e^{3} B) e^{2} C) 0 D) $\frac{1}{e^{2}}$ E) $\frac{1}{e^{3}}$

16. $\lim\limits_{x \to -\infty} \frac{2x^{2}+7x+5}{4x-x^{2}} = ?$

A) -2 B) -1 C) 0 D) 2 E) ∞

[MARMARA ÜNV. YÖS 2013]

Yanıtlar / Answers

1. A	4. E	7. D	10. B	13. B	16. A
2. C	5. E	8. C	11. B	14. E	
3. A	6. D	9. E	12. D	15. A	

1.

$$\left.\begin{array}{l}\lim\limits_{x\to\infty}\dfrac{3}{2x+1}=0\\[2ex]\lim\limits_{x\to\infty}4x-2=\infty\\[2ex]\lim\limits_{x\to\infty}\left(\dfrac{3}{2x+1}\right)\cdot 4x-2=6\end{array}\right\}\Rightarrow\lim\limits_{x\to\infty}\left(1+\dfrac{3}{2x+1}\right)^{4x-2}=e^{6}$$

Yanıt / Answer A

2.

$$\left.\begin{array}{l}\lim\limits_{x\to\infty}\dfrac{4}{4x-1}=0\\[2ex]\lim\limits_{x\to\infty}3x-5=\infty\\[2ex]\lim\limits_{x\to\infty}\left(\dfrac{4}{4x-1}\right)\cdot 3x-5=3\end{array}\right\}\Rightarrow\lim\limits_{x\to\infty}\left(1+\dfrac{4}{4x-1}\right)^{3x-5}=e^{3}$$

Yanıt / Answer C

3.

$$\left.\begin{array}{l}\lim\limits_{x\to\infty}\dfrac{-4}{3x}=0\\[2ex]\lim\limits_{x\to\infty}x=\infty\\[2ex]\lim\limits_{x\to\infty}\dfrac{-4}{3x}\cdot x=-\dfrac{4}{3}\end{array}\right\}\Rightarrow\lim\limits_{x\to\infty}\left(1-\dfrac{4}{3x}\right)^{x}=e^{-\frac{4}{3}}$$

Yanıt / Answer A

4.

$$\left.\begin{array}{l}\lim\limits_{x\to\infty}\dfrac{2}{x}=0\\[2ex]\lim\limits_{x\to\infty}3x=\infty\\[2ex]\lim\limits_{x\to\infty}\dfrac{2}{x}\cdot 3x=6\end{array}\right\}\Rightarrow\lim\limits_{x\to\infty}\left(1+\dfrac{2}{x}\right)^{3x}=e^{6}$$

Yanıt / Answer E

5.

$$\lim\limits_{x\to\infty}\left(\dfrac{x+2}{x}\right)^{2x}=\lim\limits_{x\to\infty}\left(1+\dfrac{2}{x}\right)^{2x}$$

$$\left.\begin{array}{l}\lim\limits_{x\to\infty}\dfrac{2}{x}=0\\[2ex]\lim\limits_{x\to\infty}2x=\infty\\[2ex]\lim\limits_{x\to\infty}\left(\dfrac{2}{x}\cdot 2x\right)=4\end{array}\right\}\Rightarrow\lim\limits_{x\to\infty}\left(1+\dfrac{2}{x}\right)^{2x}=e^{4}$$

Yanıt / Answer E

6.

$$\left.\begin{array}{l}\lim\limits_{x\to\infty}\dfrac{3}{x+1}=0\\[2ex]\lim\limits_{x\to\infty}3x-1=\infty\\[2ex]\lim\limits_{x\to\infty}\left(\dfrac{3}{x+1}\right)\cdot 3x-1=9\end{array}\right\}\Rightarrow\lim\limits_{x\to\infty}\left(1+\dfrac{3}{x+1}\right)^{3x-1}=e^{9}$$

Yanıt / Answer D

7.

$$\lim\limits_{x\to\infty}\left(\dfrac{4x+1}{4x-5}\right)^{2x}=\lim\limits_{x\to\infty}\left(1+\dfrac{6}{4x-5}\right)^{2x}$$

$$\left.\begin{array}{l}\lim\limits_{x\to\infty}\dfrac{6}{4x-5}=0\\[2ex]\lim\limits_{x\to\infty}2x=\infty\\[2ex]\lim\limits_{x\to\infty}\dfrac{6}{4x-5}\cdot 2x=3\end{array}\right\}\Rightarrow\lim\limits_{x\to\infty}\left(1+\dfrac{6}{4x-5}\right)^{2x}=e^{3}$$

Yanıt / Answer D

8.

$$\lim\limits_{x\to\infty}\left(\dfrac{3x^2+4x+1}{3x^2+1}\right)^{4x+1}=\lim\limits_{x\to\infty}\left(1+\dfrac{4x}{3x^2+1}\right)^{4x+1}$$

$$\left.\begin{array}{l}\lim\limits_{x\to\infty}\dfrac{4x}{3x^2+1}=0\\[2ex]\lim\limits_{x\to\infty}4x+1=\infty\\[2ex]\lim\limits_{x\to\infty}\dfrac{4x}{3x^2+1}\cdot 4x+1=\dfrac{16}{3}\end{array}\right\}\Rightarrow\lim\limits_{x\to\infty}\left(\dfrac{3x^2+4x+1}{3x^2+1}\right)^{4x+1}=e^{\frac{16}{3}}$$

Yanıt / Answer C

9. $\lim\limits_{x\to 0}(1-\tan x)^{\frac{2}{x}} \quad (1^{\infty})$

$$\frac{2}{x}=t \Rightarrow x=\frac{2}{t}$$

$$x\to 0 \Rightarrow t\to\infty$$

$$\lim_{x\to\infty}\left(1-\tan\frac{2}{t}\right)^{t}=\lim_{x\to\infty}\tan\frac{2}{t}\cdot t=2$$

$$\Rightarrow \lim_{t\to\infty}\left(1-\tan\frac{2}{t}\right)^{t}=e^{2}$$

Yanıt / Answer E

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10. $\lim\limits_{x\to 0}\left(e^{x}-\frac{x}{3}\right)^{\frac{4}{x}} \quad (1^{\infty})$

$$\frac{4}{x}=t \Rightarrow x=\frac{4}{t}$$

$$\lim_{t\to\infty}\left(e^{\frac{4}{t}}+\frac{4}{3t}\right)^{t}=\lim_{t\to\infty}\left(\frac{4}{3t}\cdot t\right)=\frac{4}{3}$$

$$\Rightarrow \lim_{x\to\infty}\left(e^{x}-\frac{x}{3}\right)^{\frac{4}{x}}=e^{\frac{4}{3}}$$

Yanıt / Answer B

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11. $\lim\limits_{x\to 0}\left(e^{x}+2x\right)^{\frac{2}{x}} \quad (1^{\infty})$

$$\frac{2}{x}=t \Rightarrow x=\frac{2}{t}$$

$$\lim_{x\to 0}\left(e^{x}+2x\right)^{\frac{2}{x}}=\lim_{t\to\infty}\left(e^{\frac{2}{t}}+2\cdot\frac{2}{t}\right)^{t}$$

$$\left.\begin{aligned}&\lim_{t\to\infty}\frac{4}{t}=0\\&\lim_{t\to\infty}t=\infty\\&\lim_{t\to\infty}\frac{4}{t}\cdot t=4\end{aligned}\right\}\Rightarrow \lim_{x\to 0}\left(e^{x}+2x\right)^{\frac{2}{x}}=e^{4}$$

Yanıt / Answer B

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12. $\lim\limits_{x\to 1}x^{\frac{1}{x-1}} \quad (1^{\infty})$

$$\frac{1}{x-1}=t \Rightarrow x=\frac{1}{t}+1$$

$$x\to 1 \Rightarrow t\to\infty$$

$$\lim_{x\to\infty}\left(1+\frac{1}{t}\right)^{t}=e^{1}=e$$

Yanıt / Answer D

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13. $\lim\limits_{x\to 0}\left(1-\frac{2x}{3}\right)^{\frac{6}{x}} \quad (1^{\infty})$

$$\frac{6}{x}=t \Rightarrow x=\frac{6}{t}$$

$$\lim_{x\to 0}\left(1-\frac{2x}{3}\right)^{\frac{6}{x}}=\lim_{t\to\infty}\left(1-\frac{12}{3t}\right)^{t}=\lim_{t\to\infty}\frac{-12}{3t}\cdot t=-4$$

$$\Rightarrow \lim_{x\to 0}\left(1-\frac{2x}{3}\right)^{\frac{6}{x}}=e^{-4}$$

Yanıt / Answer B

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14. $\lim\limits_{x\to\infty}\left(\frac{x^{2}+3x+1}{x^{2}-1}\right)^{2x}=\lim\limits_{x\to\infty}\left(1+\frac{3x+2}{x^{2}-1}\right)^{2x}$

$$\left.\begin{aligned}&\lim_{x\to\infty}\frac{3x+2}{x^{2}-1}=0\\&\lim_{x\to\infty}2x=\infty\\&\lim_{x\to\infty}\left(\frac{3x+2}{x^{2}-1}\right)\cdot 2x=16\end{aligned}\right\}\lim_{x\to\infty}\left(\frac{x^{2}+3x+1}{x^{2}-1}\right)^{2x}=e^{6}$$

Yanıt / Answer E

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15. $\lim\limits_{x\to 0}(1+3x)^{\frac{1}{x}} \quad (1^{\infty})$

$$t=\frac{1}{x} \Rightarrow x=\frac{1}{t}$$

$$\lim_{x\to 0}(1+3x)^{\frac{1}{x}}=\lim_{t\to\infty}\left(1+\frac{3}{t}\right)^{t}$$

$$\left.\begin{aligned}&\lim_{t\to\infty}\frac{3}{t}=0\\&\lim_{t\to\infty}t=\infty\\&\lim_{t\to\infty}\frac{3}{t}\cdot t=3\end{aligned}\right\}\Rightarrow \lim_{x\to 0}(1+3x)^{\frac{1}{x}}=e^{3}$$

Yanıt / Answer A

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16. $\lim\limits_{x\to -\infty}\frac{2x^{2}+7x+5}{4x-x^{2}} \Rightarrow$

$$\lim_{x\to -\infty}\frac{2x^{2}+7x+5}{4x-x^{2}}=\frac{2x^{2}}{-x^{2}}=-2$$

Yanıt / Answer A

TÜREV
DERIVATIVE

BÖLÜM
CHAPTER 2

Türev / Derivative

Test 1

1. $f(x)=x^3+\sqrt{x^2} \Rightarrow \lim\limits_{x\to 0^+}\dfrac{f(x)-f(0)}{x-0}=?$

A) –3 B) –1 C) 0 D) 1 E) 3

2. $f(x)=\dfrac{x^2+2}{2-x^2} \Rightarrow \lim\limits_{x\to 2}\dfrac{f(x)-f(2)}{x-2}=?$

A) –4 B) –3 C) –2 D) 3 E) 4

3. $f(x) = 3x^4 - 2x^3 + x^2 - 5x + 7$

$\Rightarrow f'(1) + f'(0) = ?$

A) –3 B) –2 C) –1 D) 2 E) 0

4. $f(x)=\begin{cases} -x^4-2x^3+3x, & x\le 3 \\ \sqrt{x+5}, & x>3 \end{cases}$

$\Rightarrow f'(-2) + f'(4) = ?$

A) $\dfrac{67}{6}$ B) $\dfrac{89}{6}$ C) $\dfrac{134}{9}$ D) $\dfrac{181}{9}$ E) $\dfrac{199}{18}$

5. $f(x) = 5x^3 - 6x^2 - ax - b$

$f'(2) = 34 \Rightarrow a = ?$

A) –2 B) –1 C) 0 D) 1 E) 2

6. $f(x) = (x^4 - x^3 + x)\cdot(x^2 - 3) \Rightarrow f'(-2) = ?$

A) –131 B) –101 C) –81 D) –51 E) –31

7. $f(x)=\dfrac{2a}{3x+2},\ f'(-1)=12 \Rightarrow a=?$

A) –6 B) –4 C) –2 D) 2 E) 4

8. $f(x)=\dfrac{(x^2-1)(x-2)}{x+2} \Rightarrow f'(-1)=?$

A) 2 B) 3 C) 4 D) 5 E) 6

9. $f(x) = (2x^3 - x^2)^{20} \Rightarrow \mathbf{f'(1) = ?}$

A) –80 B) –40 C) –20 D) 40 E) 80

10. $f(2x) = 2x^3 - 3x^2 + 4x + 5 \Rightarrow \mathbf{f(2) + f'(2) = ?}$

A) 8 B) 9 C) 10 D) 12 E) 14

11. $x \in N$,

$f(x^2 - 1) = 3x^3 + 4x^2 - 4x - 7 \Rightarrow \mathbf{f'(3) = ?}$

A) 6 B) 9 C) 10 D) 12 E) 16

12. $f(x) = g(2x - 3)$,

$g'(5) = -7 \Rightarrow \mathbf{f'(4) = ?}$

A) –18 B) –16 C) –15 D) –14 E) –11

13. $f(x) = x^2 \cdot \sqrt{3x - 2} \Rightarrow \mathbf{f'(1) = ?}$

A) $\frac{11}{2}$ B) $\frac{9}{2}$ C) $\frac{7}{2}$ D) $\frac{5}{2}$ E) $\frac{3}{2}$

14. $f(x) = \sqrt{(2x+1)^3} \Rightarrow \mathbf{f'(4) = ?}$

A) 3 B) 6 C) 9 D) 12 E) 18

15. $f(x) = x^2 - 3$,

$g(x) = x^3 \Rightarrow \mathbf{(gof)'(2) = ?}$

A) 2 B) 3 C) 4 D) 6 E) 12

16. $f(x) = (\cos 3x)^3 \Rightarrow \mathbf{f'(\frac{\pi}{3}) = ?}$

A) –1 B) 0 C) 1

D) 2 E) 3

[İSTANBUL ÜNV. YÖS 2013]

Yanıtlar / Answers

1. D	4. A	7. C	10. A	13. C	16. B
2. E	5. E	8. E	11. D	14. C	
3. B	6. A	9. E	12. D	15. E	

1.
$$\lim_{x\to 0^+}\frac{x^3+\sqrt{x^2}-0}{x-0}=\lim_{x\to 0^+}\frac{x^3+x}{x}$$
$$=\lim_{x\to 0^+}\frac{x(x^2+1)}{x}$$
$$=\lim_{x\to 0^+}x^2+1=1$$

Yanıt / Answer D

2. $f(x)=\dfrac{x^2+2}{2-x^2}\Rightarrow f'(x)=\dfrac{2x\cdot(2-x^2)-(x^2+2)\cdot(-2x)}{(2-x^2)^2}$

$$\lim_{x\to 2}\frac{f(x)-f(2)}{x-2}=f'(2)$$
$$=\frac{4\cdot(2-4)+4\cdot(4+2)}{(2-4)^2}$$
$$=\frac{-8+24}{4}=\frac{16}{4}=4$$

Yanıt / Answer E

3. $f(x)=3x^4-2x^3+x^2-5x+7$

$f'(x)=12x^3-6x^2+2x-5$

$f'(0)=-5$

$f'(1)=12-6+2-5=3$

$f'(0)+f'(1)=-5+3=-2$

Yanıt / Answer B

4. $-2<3\Rightarrow f(x)=-x^4-2x^3+3x$

a. $f'(x)=-4x^3-6x^2+3$

$f'(-2)=-4(-2)^3-6(-2)^2+3$

$=32-24+3=11$

b. $4>3\Rightarrow f(x)=\sqrt{x+5}$

$$f'(x)=\frac{1}{2\sqrt{x+5}}$$
$$f'(4)=\frac{1}{2\sqrt{4+5}}=\frac{1}{6}$$
$$f'(-2)+f'(4)=11+\frac{1}{6}=\frac{67}{6}$$

Yanıt / Answer A

5. $f(x)=5x^3-6x^2-ax-b$

$f'(x)=15x^2-12x-a$

$f'(2)=15\cdot4-12\cdot2-a$

$34=60-24-a$

$a=36-34$

$a=2$

Yanıt / Answer E

6. $f(x)=(x^4-x^3+x)\cdot(x^2-3)$

$f'(x)=(4x^3-3x^2+1)\cdot(x^2-3)+(x^4-x^3+x)(2x)$

$f'(-2)=(4(-8)-3\cdot4+1)\cdot(4-3)+(16+8-2)\cdot(-4)$

$f'(-2)=(-32-12+1)\cdot(1)+(22)\cdot(-4)$

$f'(-2)=-43-88=-131$

Yanıt / Answer A

7. $f(x)=\dfrac{2a}{3x+2}$

$$f'(x)=\frac{0\cdot(3x+2)-2a\cdot3}{(3x+2)^2}$$
$$f'(-1)=\frac{-6a}{(-3+2)^2}=12$$
$$-6a=12\Rightarrow a=-2$$

Yanıt / Answer C

8. $f(x)=\dfrac{(x^2-1)(x-2)}{x+2}$

$$f'(x)=\frac{\left[2x(x-2)+(x^2-1)\right]\cdot(x+2)-(x^2-1)\cdot(x-2)\cdot1}{(x+2)^2}$$
$$f'(-1)=\frac{\left[-2(-1-2)+(1-1)\right]\cdot(-1+2)-(1-1)\cdot(-1-2)\cdot1}{(-1+2)^2}$$
$$f'(-1)=\frac{\left[-2(-3)+0\right]\cdot(-1+2)-0}{1}=6$$

Yanıt / Answer E

9. $f(x) = (2x^3 - x^2)^{20}$

$f'(x) = 20(2x^3 - x^2)^{19} \cdot (6x^2 - 2x)$

$f'(1) = 20(2 - 1)^{19} \cdot (6 \cdot 1 - 2 \cdot 1)$

$f'(1) = 20 \cdot 1 \cdot (6 - 2) = 20 \cdot 4 = 80$

Yanıt / Answer E

10. $f(2x) = 2x^3 - 3x^2 + 4x + 5 \Rightarrow \begin{cases} 2f'(2x) = 6x^2 - 6x + 4 \\ f'(2x) = 3x^2 - 3x + 2 \end{cases}$

$x = 1 \Rightarrow \begin{cases} f(2) = 2 \cdot 1 - 3 \cdot 1 + 4 + 3 = 6 \\ f'(2) = 3 \cdot 1 - 3 \cdot 1 + 2 = 2 \end{cases}$

$f(2) + f'(2) = 6 + 2 = 8$

Yanıt / Answer A

11. $x^2 - 1 = 3 \Rightarrow x = \mp 2$

$f(x^2 - 1) = 3x^3 + 4x^2 - 4x - 7$

$\Rightarrow \ 2x \cdot f'(x^2 - 1) = 9x^2 + 8x - 4 \quad , \ (x \geq 0)$

$2 \cdot 2 \cdot f'(4 - 1) = 9 \cdot (2)^2 + 8 \cdot (2) - 4$

$4 \cdot f'(3) = 36 + 16 - 4$

$4 \cdot f'(3) = 48$

$f'(3) = 12$

Yanıt / Answer D

12. $2x - 3 = 5 \Rightarrow 2x = 8 \Rightarrow x = 4$

$f(x) = g(2x - 3)$

$f'(x) = 2 \cdot g'(2x - 3)$

$f'(4) = 2 \cdot g'(8 - 3)$

$f'(4) = 2 \cdot g'(5)$

$(g'(5) = -7) \Rightarrow f'(4) = 2 \cdot (-7)$

$= -14$

Yanıt / Answer D

13. $f(x) = x^2 \cdot \sqrt{3x - 2}$

$f'(x) = 2x \cdot \sqrt{3x-2} + x^2 \cdot \dfrac{3}{2\sqrt{3x-2}}$

$f'(1) = 2 \cdot \sqrt{3-2} + 1 \cdot \dfrac{3}{2\sqrt{3-2}}$

$f'(1) = 2 \cdot 1 + \dfrac{3}{2} = \dfrac{7}{2}$

Yanıt / Answer C

14. $f(x) = \sqrt{(2x+1)^3} = (2x+1)^{\frac{3}{2}}$

$f'(x) = \dfrac{3}{2} \cdot (2x+1)^{\frac{3}{2}-1} \cdot 2 = 3 \cdot (2x+1)^{\frac{1}{2}}$

$f'(4) = 3 \cdot (8+1)^{\frac{1}{2}} = 3 \cdot 9^{\frac{1}{2}} = 3 \cdot 3 = 9$

Yanıt / Answer C

15. $\left.\begin{array}{l} f(x) = x^2 - 3 \\ g(x) = x^3 \end{array}\right\} \Rightarrow (gof)(x) = (x^2 - 3)^3$

$\Rightarrow (gof)'(x) = 3(x^2 - 3)^2 \cdot (2x)$

$(gof)'(2) = 3(4 - 3)^2 \cdot (2 \cdot 2)$

$(gof)'(2) = 3 \cdot 1 \cdot 4 = 12$

Yanıt / Answer E

16. $f(x) = (\cos 3x)^3$

$= -3 \cdot (\cos 3x)^2 \cdot \sin 3x \cdot 3$

$= 3 \cdot (\cos 3 \cdot \dfrac{\pi}{3}) \cdot \underbrace{\sin 3 \cdot \dfrac{\pi}{3}}_{0} \cdot 3 = 0$

Yanıt / Answer B

By yos lovers

L

1. $$\left.\begin{array}{l} f(x)=x^4-ax^2+1 \\ \lim\limits_{x\to 2}\dfrac{f(x)-f(2)}{x-2}=16 \end{array}\right\} \Rightarrow \mathbf{a=?}$$

A) 4 B) 6 C) 8 D) 10 E) 12

2. $f(x) = 3x^2 - 2x + 1$

$$\lim\limits_{h\to 0}\frac{\mathbf{f(h+1)-f(1)}}{\mathbf{h}}=\mathbf{?}$$

A) 1 B) 2 C) 3 D) 4 E) 5

3. $$f(x)=\begin{cases} 3x^2-2x+1, & x\geq 1 \\ 4x-3\ , & x<1 \end{cases} \Rightarrow \mathbf{f'(2)=?}$$

A) 8 B) 9 C) 10 D) 12 E) 14

4. $f(x) = ax^3 + 2x^2 + x - b$

$f(1)' = 2 \Rightarrow \mathbf{a = ?}$

A) –2 B) –1 C) 0 D) 1 E) 2

5. $$f(x)=\frac{x^2+1}{x+1} \Rightarrow \mathbf{f'(1)=?}$$

A) $\frac{1}{2}$ B) $\frac{1}{4}$ C) 1 D) 2 E) 4

6. $f(2x - 3) = 3x^3 + 4x^2 - 5x + 6 \Rightarrow \mathbf{f'(-1) = ?}$

A) 4 B) $\frac{9}{2}$ C) 5 D) $\frac{11}{2}$ E) 6

7. $f(x) = 2x\cdot|x^2 - 1| \Rightarrow \mathbf{f'(2) = ?}$

A) 12 B) 18 C) 22 D) 24 E) 26

8. $f(x) = |x^2 - 3x - 4| \Rightarrow \mathbf{f'(3) = ?}$

A) –3 B) –2 C) 2 D) 3 E) 4

9. $f(x) = 4x^3 + 3x^2 - 2 \Rightarrow$ **$f'(2) + f''(3) = ?$**

A) 118 B) 124 C) 128 D) 134 E) 138

10. $f(x) = (x-1)^2 (2x - a)$

$f''(0) = 0 \Rightarrow$ **$a = ?$**

A) –4 B) –2 C) 0 D) 2 E) 4

11. $f(x) = \sqrt[3]{(3x^2+4)^2} \Rightarrow$ **$f'(2\sqrt{5}) = ?$**

A) $4\sqrt{5}$ B) $3\sqrt{5}$ C) $2\sqrt{5}$

D) $\sqrt{5}$ E) $\dfrac{\sqrt{5}}{2}$

12. $f(x) = x^2 + 2,$

$g(x) = 3x - 1$

$\Rightarrow$ **$(fog)'(x) = ?$**

A) $12x - 6$ B) $12x + 6$ C) $16x + 4$

D) $16x - 6$ E) $18x - 6$

13. $f(x) = x^2 + 1,$

$g(x) = 2x - 3$

$\Rightarrow$ **$(fog)'(3) = ?$**

A) 8 B) 10 C) 12 D) 18 E) 24

14. $f(2x + 2) = f(x) - 5x + 3m$

$f'(-2) = 2m + 1 \Rightarrow$ **$m = ?$**

A) –4 B) –3 C) –2 D) 2 E) 3

15. $\dfrac{f(3x)}{g(x-2)} = x^3$, $f'(3) = 5$, $g(-1) = 2$

$\Rightarrow$ **$g'(-1) + f(3) = ?$**

A) 9 B) 10 C) 11 D) 12 E) 13

16. $f(2x + 1) = x^3 - 6x + 1$

$f'(1) = ?$

A) –3 B) –2 C) 0

D) 1 E) 5

[KTÜ. YÖS 2013]

Yanıtlar / Answers

1. A	4. B	7. C	10. A	13. C	16. A
2. D	5. A	8. A	11. C	14. B	
3. C	6. E	9. E	12. E	15. C	

1. $\lim\limits_{x\to 2}\dfrac{f(x)-f(2)}{x-2}=f'(2)=16$

$f(x)=x^4-ax^2+1 \Rightarrow f'(x)=4x^3-2ax$

$f'(2)=32-4a$

$16=32-4a$

$4a=16$

$a=4$

Yanıt / Answer A

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2. $f(x)=3x^2-2x+1$

$f'(x)=6x-2$

$\lim\limits_{h\to 0}\dfrac{f(h+1)-f(1)}{h}=f'(1)$

$=6\cdot1-2=6-2=4$

Yanıt / Answer D

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3. $2>1 \Rightarrow f(x)=3x^2-2x+1$

$f'(x)=6x-2$

$f'(2)=6\cdot2-2=10$

Yanıt / Answer C

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4. $f(x)=ax^3+2x^2+x-b$

$f'(x)=3ax^2+4x+1$

$f'(1)=3a+4+1$

$2=3a+5$

$-3=3a$

$a=-1$

Yanıt / Answer B

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5. $f(x)=\dfrac{x^2+1}{x+1}$

$f'(x)=\dfrac{2x\cdot(x+1)-(x^2+1)\cdot1}{(x+1)^2}$

$f'(1)=\dfrac{2\cdot(1+1)-(1+1)}{(1+1)^2}$

$f'(1)=\dfrac{4-2}{4}=\dfrac{2}{4}=\dfrac{1}{2}$

Yanıt / Answer A

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6. $2x-3=-1 \Rightarrow 2x=2 \Rightarrow x=1$

$f(2x-3)=3x^3+4x^2-5x+6$

$2\cdot f'(2x-3)=9x^2+8x-5$

$2\cdot f'(-1)=9\cdot1+8\cdot1-5$

$2\cdot f'(-1)=12$

$f'(-1)=6$

Yanıt / Answer E

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7. $x=2 \Rightarrow x^2-1>0 \Rightarrow |x^2-1|=x^2-1$

$\Rightarrow f(x)=2x(x^2-1)=2x^3-2x$

$f'(x)=6x^2-2$

$f'(2)=6\cdot4-2=22$

Yanıt / Answer C

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8. $x=3 \Rightarrow x^2-3x-4<0$

$f(x)=|x^2-3x-4|=-x^2+3x+4$

$f'(x)=-2x+3$

$f'(3)=-2\cdot3+3=-3$

Yanıt / Answer A

9. $f(x)=4x^3+3x^2-2 \Rightarrow \begin{cases} f'(x)=12x^2+6x \\ f''(x)=24x+6 \end{cases}$

$f'(2)=12\cdot 4+6\cdot 2=48+12=60$

$f''(3)=24\cdot 3+6=72+6=78$

$f'(2)+f''(3)=60+78=138$

Yanıt / Answer E

10. $f(x)=(x-1)^2(2x-a)$

$f'(x)=2(x-1)(2x-a)+(x-1)^2\cdot 2$

$f''(x)=2(2x-a)+4(x-1)+4(x-1)$

$f''(0)=2(-a)+4(-1)+4(-1)$

$0=-2a-4-4$

$2a=-8$

$a=-4$

Yanıt / Answer A

11. $f(x)=(3x^2+4)^{\frac{2}{3}}$

$f'(x)=\frac{2}{3}(3x^2+4)^{\frac{2}{3}-1}\cdot(6x)$

$f'(2\sqrt{5})=\frac{2}{3}(3\cdot 20+4)^{-\frac{1}{3}}\cdot(6\cdot 2\sqrt{5})$

$=\frac{2}{3}\cdot\frac{1}{\sqrt[3]{64}}\cdot 12\sqrt{5}=\frac{8\sqrt{5}}{4}=2\sqrt{5}$

Yanıt / Answer C

12. $\left.\begin{array}{l} f(x)=x^2+2 \\ g(x)=3x-1 \end{array}\right\} \Rightarrow (fog)(x)=(3x-1)^2+2$

$(fog)'(x)=2\cdot 3\cdot(3x-1)$

$=6(3x-1)$

$=18x-6$

Yanıt / Answer E

13. $\left.\begin{array}{l} f(x)=x^2+1 \\ g(x)=2x-3 \end{array}\right\} \Rightarrow (fog)(x)=(2x-3)^2+1$

$(fog)'(x)=2\cdot(2x-3)\cdot 2$

$(fog)'(3)=2\cdot(2\cdot 3-3)\cdot 2=2\cdot 3\cdot 2=12$

Yanıt / Answer C

14. $2\cdot f'(2x+2)=f'(x)-5$

$2x+2=-2 \Rightarrow x=-2$

$2\cdot f'(-2)=f'(-2)-5$

$f'(-2)=-5$

$2m+1=-5$

$2m=-6$

$m=-3$

Yanıt / Answer B

15. $f(3x)=x^3\cdot g(x-2)$

$\Rightarrow 3\cdot f'(3x)=3x^2\cdot g(x-2)+x^3 g'(x-2)$

$x-2=-1 \Rightarrow x=1$

$3\cdot f'(3)=3\cdot 1\cdot g(1-2)+1\cdot g'(-1)$

$3\cdot f'(3)=3\cdot 1\cdot g(-1)+1\cdot g'(-1)$

$f'(3)=5,\ g(-1)=2$

$\Rightarrow 3\cdot 5=3\cdot 2+g'(-1)$

$15=6+g'(-1)$

$g'(-1)=9$

$f(3x)=x^3\cdot g(-1)$

$f(3)=1\cdot 2=2$

$\Rightarrow f(3)+g'(-1)=2+9=11$

Yanıt / Answer C

16. $2\cdot f'(2x+1)=3x^2-6$

$x=0 \Rightarrow 2\cdot f'(1)=-6$

$f'(1)=-3$

Yanıt / Answer A

By yos lovers
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1. $f(x)=\sin 3x \Rightarrow f'(\frac{2\pi}{3})=?$

A) -3 B) -1 C) 0 D) 1 E) 3

2. $f(x)=\sin 5x+\cos 5x \Rightarrow f'(\pi)=?$

A) -5 B) -3 C) -1 D) 1 E) 5

3. $f(x)=\cos\frac{x}{3} \Rightarrow f'(\frac{\pi}{2})=?$

A) $-\frac{1}{2}$ B) $-\frac{1}{6}$ C) 0 D) $\frac{1}{6}$ E) $\frac{1}{2}$

4. $f(x)=\frac{\sin x}{1-\cos x} \Rightarrow f'(\pi)=?$

A) -1 B) $-\frac{1}{2}$ C) 0 D) $\frac{1}{2}$ E) 1

5. $f(x)=\tan x-\cot x+\cos^2 x \Rightarrow f'(\frac{5\pi}{4})=?$

A) -3 B) -2 C) -1 D) 2 E) 3

6. $f(x)=\sin 2x-\cos^2 x \Rightarrow f'(\frac{\pi}{3})=?$

A) $\frac{-2+\sqrt{3}}{2}$ B) $\frac{-2\sqrt{3}}{3}$ C) $\frac{2+\sqrt{3}}{4}$ D) $\frac{2-\sqrt{3}}{2}$ E) $\frac{-2+\sqrt{3}}{3}$

7. $f(x)=\sin 4x+\sin^4 x \Rightarrow f'(\frac{3\pi}{4})=?$

A) -5 B) -4 C) $-\sqrt{2}$ D) -3 E) $\sqrt{2}$

8. $f(x)=\sin^2 3x \Rightarrow f'(\frac{\pi}{12})=?$

A) 2 B) 3 C) 4 D) 6 E) 9

9. $f(x) = \tan^2(2x) \Rightarrow \mathbf{f'(\frac{\pi}{8}) = ?}$

A) $-\frac{\pi}{4}$ B) $-\frac{\pi}{8}$ C) 4 D) 8 E) 12

10. $f(x) = \cot^2(4x) \Rightarrow \mathbf{f'(\frac{\pi}{16}) = ?}$

A) −16 B) −8 C) $\frac{\pi}{2}$ D) $\frac{\pi}{4}$ E) $\frac{\pi}{8}$

11. $f(x) = \sin 4x \cdot \cos 3x \Rightarrow \mathbf{f'(\pi) = ?}$

A) −5 B) −4 C) −3 D) 3 E) 5

12. $f(x) = \tan^3 x \Rightarrow \mathbf{f'(\frac{\pi}{4}) = ?}$

A) 4 B) 6 C) 7 D) 8 E) 10

13. $f(x) = \sin^3 x \cdot \cos x \Rightarrow \mathbf{f'(\frac{\pi}{6}) = ?}$

A) $-\frac{1}{2}$ B) $-\frac{1}{4}$ C) 0 D) $\frac{1}{4}$ E) $\frac{1}{2}$

14. $f(x) = \frac{\cos^2 x - 1}{\tan^2 x} \Rightarrow \mathbf{f'(\frac{\pi}{8}) = ?}$

A) $-\frac{\sqrt{2}}{2}$ B) $-\frac{1}{2}$ C) 0 D) $\frac{1}{2}$ E) $\frac{\sqrt{2}}{2}$

15. $f(x) = (1 - \cos 2x) \cdot \sin 2x \Rightarrow \mathbf{f'(\frac{\pi}{2}) = ?}$

A) −6 B) −4 C) $-2\sqrt{3}$

D) 4 E) $2\sqrt{3}$

16. $f(x) = \ln^2(xe^x)$

$\Rightarrow \mathbf{f'(1) = ?}$

A) −2e B) 3e C) 4

D) e^2 E) 2

[YTÜ. YÖS 2013]

Yanıtlar / Answers

1. E	4. B	7. A	10. A	13. E	16. C
2. A	5. E	8. B	11. B	14. E	
3. B	6. A	9. D	12. B	15. B	

1. $f(x)=\sin 3x$

$f'(x)=3\cdot\cos 3x$

$f'(\frac{2\pi}{3})=3\cdot\cos 3\cdot\frac{2\pi}{3}$

$f'(\frac{2\pi}{3})=3\cdot\underbrace{\cos 2\pi}_{1}=3$

Yanıt / Answer E

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2. $f(x)=\sin 5x+\cos 5x$

$f'(x)=5\cdot\cos 5x-5\cdot\sin 5x$

$f'(\pi)=5\cdot\cos 5\pi-5\cdot\sin 5\pi$

$=5\cdot(-1)-5\cdot 0=-5$

Yanıt / Answer A

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3. $f(x)=\cos\frac{x}{3}$

$f'(x)=-\frac{1}{3}\sin\frac{x}{3}$

$f'(\frac{\pi}{2})=-\frac{1}{3}\sin\frac{\pi}{6}=\frac{-1}{3}\cdot\frac{1}{2}=-\frac{1}{6}$

Yanıt / Answer B

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4. $f(x)=\frac{\sin x}{1-\cos x}$

$f'(x)=\frac{\cos x(1-\cos x)-\sin x\cdot(\sin x)}{(1-\cos x)^2}$

$=\frac{\cos x-\cos^2 x-\sin^2 x}{(1-\cos x)^2}=\frac{\cos x-1}{(\cos x-1)^2}=\frac{1}{\cos x-1}$

$f'(\pi)=\frac{1}{\cos\pi-1}=\frac{1}{-1-1}=-\frac{1}{2}$

Yanıt / Answer B

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5. $f(x)=\tan x-\cot x+\cos^2 x$

$f'(x)=\left[1+\tan^2 x\right]+\left[1+\cot^2 x\right]-\sin 2x$

$f'(\frac{5\pi}{4})=\left[1+\tan^2\frac{5\pi}{4}\right]+\left[1+\cot^2\frac{5\pi}{4}\right]-\sin\frac{5\pi}{2}$

$f'(\frac{5\pi}{4})=\left[1+\underbrace{\tan^2\frac{\pi}{4}}_{1}\right]+\left[1+\underbrace{\cot^2\frac{\pi}{4}}_{1}\right]-\sin\frac{\pi}{2}$

$f'(\frac{5\pi}{4})=[1+1]+[1+1]+1=2+2-1=3$

Yanıt / Answer E

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6. $f(x)=\sin 2x-\cos^2 x$

$f'(x)=2\cdot\cos 2x+2\cdot\sin x\cdot\cos x$

$=2\cdot\cos 2x+\sin 2x$

$f'(\frac{\pi}{3})=2\cdot\cos\frac{2\pi}{3}+\sin\frac{2\pi}{3}$

$=-2\cdot\cos\frac{\pi}{3}+\sin\frac{\pi}{3}$

$=-2\cdot\frac{1}{2}+\frac{\sqrt{3}}{2}$

$=-1+\frac{\sqrt{3}}{2}=\frac{-2+\sqrt{3}}{2}$

Yanıt / Answer A

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7. $f(x)=\sin 4x+\sin^4 x$

$f'(x)=4\cdot\cos 4x+4\cdot\sin^3 x\cdot\cos x$

$f'(\frac{3\pi}{4})=4\cdot\underbrace{\cos 3\pi}_{-1}+4\cdot\sin^3\frac{3\pi}{4}\cdot\cos\frac{3\pi}{4}$

$=-4+4(\sin^3 45°)\cdot(-\cos 45°)$

$=-4-4\cdot\left(\frac{\sqrt{2}}{2}\right)^3\cdot\left(\frac{\sqrt{2}}{2}\right)$

$=-4-4\cdot\frac{4}{16}=-4-1=-5$

Yanıt / Answer A

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8. $f(x)=\sin^2 3x\Rightarrow f'(x)=3\cdot 2\sin 3x\cdot\cos 3x$

$f'(x)=3\cdot\sin 6x$

$f'(\frac{\pi}{12})=3\cdot\sin\frac{6\pi}{12}=3\cdot\underbrace{\sin\frac{\pi}{2}}_{1}=3$

Yanıt / Answer B

9. $f(x)=\tan^2(2x) \Rightarrow f'(x)=4\cdot\tan(2x)\,[1+\tan^2 2x]$

$$f'(\tfrac{\pi}{8})=4\cdot\underbrace{\tan\frac{\pi}{4}}_{1}\left[1+\underbrace{\tan^2\frac{\pi}{4}}_{1}\right]$$

$$f'(\tfrac{\pi}{8})=4\cdot 1\cdot[1+1]=8$$

Yanıt / Answer D

10. $f(x)=\cot^2(4x) \Rightarrow f'(x)=-8\cdot\cot 4x\,[1+\cot^2 4x]$

$$f'(\tfrac{\pi}{16})=-8\cdot\underbrace{\cot\frac{\pi}{4}}_{1}\cdot\left[1+\underbrace{\cot^2\frac{\pi}{4}}_{1}\right]=-8\cdot 1\cdot[1+1]=-16$$

Yanıt / Answer A

11. $f(x)=\sin 4x\cdot\cos 3x$

$f'(x)=4\cdot\cos 4x\cdot\cos 3x-3\cdot\sin 3x\cdot\sin 4x$

$f'(\pi)=4\cdot\cos(4\pi)\cdot\cos(3\pi)-3\cdot\sin(3\pi)\cdot\sin(4\pi)$

$f'(\pi)=4\cdot 1\cdot(-1)-3\cdot 0\cdot 0=-4$

Yanıt / Answer B

12. $f(x)=\tan^3 x$

$f'(x)=3\tan^2 x\cdot[1+\tan^2 x]$

$$f'(\tfrac{\pi}{4})=3\cdot\underbrace{\tan^2\frac{\pi}{4}}_{1}\cdot[1+\underbrace{\tan^2\frac{\pi}{4}}_{1}]$$

$$f'(\tfrac{\pi}{4})=3\cdot 1\cdot[1+1]=3\cdot 2=6$$

Yanıt / Answer B

13. $f'(x)=3\cdot\sin^2 x\cdot\cos x\cdot\cos x-\sin^3 x\cdot\sin x$

$=3\cdot(\sin x\cdot\cos x)^2-\sin^4 x$

$$f'(\tfrac{\pi}{6})=3\cdot\left(\sin\frac{\pi}{6}\cdot\cos\frac{\pi}{6}\right)^2-\left(\sin\frac{\pi}{6}\right)^4$$

$$f'(\tfrac{\pi}{6})=3\cdot\left(\frac{1}{2}\cdot\frac{\sqrt{3}}{2}\right)^2-\left(\frac{1}{2}\right)^4$$

$$f'(\tfrac{\pi}{6})=\frac{9}{16}-\frac{1}{16}=\frac{8}{16}=\frac{1}{2}$$

Yanıt / Answer E

14. $$f(x)=\frac{\cos^2 x-1}{\tan^2 x}=\frac{-\sin^2 x}{\dfrac{\sin^2 x}{\cos^2 x}}=-\cos^2 x$$

$f'(x)=2\cdot\sin x\cdot\cos x=\sin 2x$

$$f'(\tfrac{\pi}{8})=\sin\frac{\pi}{4}=\frac{\sqrt{2}}{2}$$

Yanıt / Answer E

15. $f(x)=(1-\cos 2x)\sin 2x=(1-(1-2\sin^2 x))\cdot 2\sin x\cos x$

$f(x)=4\sin^3 x\cdot\cos x$

$f'(x)=12\sin^2 x\cdot\cos x\cdot\cos x-4\sin^3 x\cdot\sin x$

$$f'\left(\frac{\pi}{2}\right)=\underbrace{12\cdot\sin^2\frac{\pi}{2}\cdot\cos^2\frac{\pi}{2}}_{0}-4\cdot\sin^3\frac{\pi}{2}\cdot\sin\frac{\pi}{2}$$

$=0-4\cdot 1\cdot 1=-4$

Yanıt / Answer B

16. $f(x)=\ln^2(xe^x)$

$$\Rightarrow f'(x)=\frac{2\ln(xe^x)\cdot(e^x+xe^x)}{xe^x}$$

$$\Rightarrow f'(1)=\frac{2\ln(e)\cdot(2e)}{e}=4$$

Yanıt / Answer C

1. $f(x) = x^2 - 2x - 1,$

$g(x) = 2 + \sin\dfrac{\pi x}{2} \Rightarrow \dfrac{g'(1)}{f'(2)} = ?$

A) –2 B) –1 C) 0 D) 1 E) 2

2. $f(x) = \cos^2 4x \Rightarrow f''\left(\dfrac{\pi}{8}\right) = ?$

A) 4 B) 8 C) 16 D) 24 E) 32

3. $f(x) = |\cos x| + 7x \Rightarrow f''\left(\dfrac{5\pi}{6}\right) = ?$

A) $-\dfrac{\sqrt{3}}{2}$ B) $-\dfrac{\sqrt{2}}{2}$ C) $-\dfrac{1}{2}$ D) $\dfrac{\sqrt{2}}{2}$ E) $\dfrac{\sqrt{3}}{2}$

4. $f(x) = \dfrac{\sin x + 1}{\cos x + 1} \Rightarrow f'\left(\dfrac{\pi}{2}\right) = ?$

A) $\dfrac{1}{2}$ B) $\dfrac{2}{3}$ C) 1 D) $\dfrac{3}{2}$ E) 2

5. $f(x) = \sin x - \cos x$

$\lim\limits_{x \to \frac{\pi}{4}} \dfrac{f(x) - f\left(\frac{\pi}{4}\right)}{x - \frac{\pi}{4}} = ?$

A) $-\sqrt{2}$ B) $-\dfrac{\sqrt{2}}{2}$ C) $\dfrac{\sqrt{2}}{2}$ D) $\sqrt{2}$ E) 2

6. $f(x) = x \cdot \cos x \Rightarrow f(x) + f''(x) = ?$

A) –2sinx B) –sinx C) 0 D) sinx E) 2sinx

7. $f(x) = \cot x - \tan x \Rightarrow \dfrac{d}{dx} f(x) = ?$

A) $-\dfrac{1}{\cos x}$ B) $-\dfrac{1}{\sin 2x}$ C) $\dfrac{2}{\cos^2 2x}$ D) $\dfrac{1}{\sin^2 2x}$ E) $\dfrac{-4}{\sin^2 2x}$

8. $f(x) = \cos\left(\dfrac{1}{x}\right) \Rightarrow f'\left(\dfrac{2}{\pi}\right) = ?$

A) $\dfrac{\pi^2}{4}$ B) $\dfrac{\pi}{2}$ C) $-\dfrac{\pi^2}{2}$ D) $\dfrac{-\pi^2}{4}$ E) $\dfrac{\pi^2}{8}$

9. $\frac{d^3}{dx^3}(\sin 2x) = ?$

A) $-4\sin 2x$ B) $-8\sin 2x$ C) $-8\cos 2x$ D) $4\cos 2x$ E) $8\cos 2x$

10. $f(x) = \sin x \cdot \cos 6x \Rightarrow f'\left(\frac{\pi}{3}\right) = ?$

A) $\frac{1}{2}$ B) 1 C) $\frac{3}{2}$ D) 2 E) $\frac{5}{2}$

11. $f(x) = 3\tan 4x \Rightarrow f'\left(\frac{\pi}{16}\right) = ?$

A) 12 B) 18 C) 20 D) 24 E) 30

12. $y = \sin^3 x^3 \Rightarrow y' = ?$

A) $9x \sin x^3 \cdot \cos x^3$

B) $9x^2 \sin x^3 \cdot \cos x^3$

C) $9x^2 \sin^2 x \cdot \cos x$

D) $9x^2 \sin^2 x^3 \cdot \cos x^3$

E) $9x \sin^2 x^3 \cdot \cos x^3$

13. $f(x) = \cos^2 x \Rightarrow \lim_{x \to 0} \frac{f(x) - f(0)}{x} = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

14. $\frac{d^2}{dx^2}(\sin^2 2x) = ?$

A) $2\cos 4x$ B) $4\cos 2x$ C) $4\sin 2x$ D) $8\cos 4x$ E) $8\sin 4x$

15. $\frac{d^2}{dx^2}(\sin^2 3x) = f(x) \Rightarrow f\left(\frac{\pi}{18}\right) = ?$

A) 36 B) 18 C) 9 D) 4 E) -9

16. $f(x) = \frac{mx+4}{x-1}, \; f'(2) = -5 \Rightarrow m = ?$

A) -3 B) 0 C) 1 D) 2 E) 4

[MARMARA ÜNV. YÖS 2013]

Yanıtlar / Answers

1. C	**4. E**	**7. E**	**10. A**	**13. C**	**16. C**
2. E	**5. D**	**8. A**	**11. D**	**14. D**	
3. A	**6. A**	**9. C**	**12. D**	**15. C**	

1. $$\left.\begin{aligned} & f'(x)=2x-2 \Rightarrow f'(2)=4-2=2 \\ & g'(x)=\frac{\pi}{2}\cdot\cos\frac{\pi x}{2} \Rightarrow g'(1)=\frac{\pi}{2}\cdot\cos\frac{\pi}{2}=0 \end{aligned}\right\}\Rightarrow$$

$$\frac{g'(1)}{f'(2)}=\frac{0}{2}=0$$

Yanıt / Answer C

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2. $$f(x)=\cos^2 4x$$

$$f'(x)=-4\cdot 2\cos 4x\cdot\sin 4x$$

$$f'(x)=-4\cdot\sin 8x$$

$$f''(x)=-32\cdot\cos 8x$$

$$f''\left(\frac{\pi}{8}\right)=-32\cdot\underbrace{\cos\pi}_{-1}=32$$

Yanıt / Answer E

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3. $$x=\frac{5\pi}{6}\Rightarrow\cos x<0\Rightarrow f(x)=-\cos x+7x$$

$$f'(x)=\sin x+7$$

$$f''(x)=\cos x$$

$$f''\left(\frac{5\pi}{6}\right)=\cos\frac{5\pi}{6}=-\cos\frac{\pi}{6}=-\frac{\sqrt{3}}{2}$$

Yanıt / Answer A

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4. $$f(x)=\frac{\sin x+1}{\cos x+1}$$

$$f'(x)=\frac{\cos x\cdot(1+\cos x)+(\sin x+1)\cdot\sin x}{(\cos x+1)^2}$$

$$=\frac{\cos x+\cos^2 x+\sin^2 x+\sin x}{(1+\cos x)^2}$$

$$=\frac{\cos x+\sin x+1}{(1+\cos x)^2}$$

$$f'\left(\frac{\pi}{2}\right)=\frac{\cos\frac{\pi}{2}+\sin\frac{\pi}{2}+1}{\left(1+\cos\frac{\pi}{2}\right)^2}$$

$$f'\left(\frac{\pi}{2}\right)=\frac{0+1+1}{(1+0)^2}=\frac{2}{1}=2$$

Yanıt / Answer E

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5. $$f'(x)=\cos x-(-\sin x)=\cos x+\sin x$$

$$\lim_{x\to\frac{\pi}{4}}\frac{f(x)-f\left(\frac{\pi}{4}\right)}{x-\frac{\pi}{4}}=f'\left(\frac{\pi}{4}\right)=\cos\frac{\pi}{4}+\sin\frac{\pi}{4}$$

$$=\frac{\sqrt{2}}{2}+\frac{\sqrt{2}}{2}=\sqrt{2}$$

Yanıt / Answer D

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6. $$f(x)=x\cdot\cos x\Rightarrow f'(x)=1\cdot\cos x-x\cdot\sin x$$

$$\Rightarrow f''(x)=-\sin x-(1\cdot\sin x+x\cdot\cos x)$$

$$=-\sin x-\sin x-x\cdot\cos x$$

$$=-2\sin x-x\cdot\cos x$$

$$f(x)+f''(x)=x\cdot\cos x-2\sin x-x\cdot\cos x=-2\sin x$$

Yanıt / Answer A

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7. $$f(x)=\cot x-\tan x$$

$$=\frac{\cos x}{\sin x}-\frac{\sin x}{\cos x}$$

$$=\frac{\cos^2 x-\sin^2 x}{\sin x\cdot\cos x}=\frac{2\cos 2x}{\sin 2x}=2(\cot 2x)$$

$$f'(x)=-4\cdot\left(1+\cot^2 2x\right)$$

$$=-4\left(1+\frac{\cos^2 2x}{\sin^2 2x}\right)$$

$$=-4\left(\frac{\sin^2 2x+\cos^2 2x}{\sin^2 2x}\right)=-\frac{4}{\sin^2 2x}$$

Yanıt / Answer E

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8. $$f(x)=\cos\left(\frac{1}{x}\right)$$

$$f'(x)=\frac{0-1}{x^2}\left(-\sin\frac{1}{x}\right)=\frac{1}{x^2}\sin\frac{1}{x}$$

$$f'\left(\frac{2}{\pi}\right)=\frac{1}{\frac{4}{\pi^2}}\cdot\sin\frac{\pi}{2}=\frac{\pi^2}{4}$$

Yanıt / Answer A

9. $\frac{d^3}{dx^3}(\sin 2x)=\frac{d^2}{dx^2}(2\cos 2x)$

$=\frac{d}{dx}(-4\cdot\sin 2x)$

$=-8\cos 2x$

Yanıt / Answer C

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10. $f(x)=\sin x\cdot\cos 6x$

$f'(x)=\cos x\cdot\cos 6x-6\sin x\cdot\sin 6x$

$f'\left(\frac{\pi}{3}\right)=\cos\frac{\pi}{3}\cdot\cos 2\pi-\underbrace{6\sin\frac{\pi}{3}\cdot\sin(2\pi)}_{0}$

$=\frac{1}{2}\cdot(1)-0=\frac{1}{2}$

Yanıt / Answer A

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11. $f(x)=3\cdot\tan 4x$

$f'(x)=12\cdot[1+\tan^2 4x]$

$f'(\frac{\pi}{16})=12\cdot[1+\tan^2\frac{\pi}{4}]$

$=12\cdot[1+(1)^2]=12\cdot(1+1)=24$

Yanıt / Answer D

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12. $y=\sin^3 x^3$

$y'=3x^2\cdot 3\cdot\sin^2 x^3\cdot\cos x^3$

$=9x^2\cdot\sin^2 x^3\cdot\cos x^3$

Yanıt / Answer D

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13. $f(x)=\cos^2 x$

$f'(x)=-2\cos x\cdot\sin x=-\sin 2x$

$\lim\limits_{x\to 0}\frac{f(x)-f(0)}{x}=f'(0)=-\sin 0=0$

Yanıt / Answer C

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14. $\frac{d^2}{dx^2}(\sin^2 2x)=\frac{d}{dx}(2\cdot 2\cdot\sin 2x\cdot\cos 2x)$

$=\frac{d}{dx}(2\cdot\sin 4x)$

$=2\cdot 4\cdot\cos 4x=8\cos 4x$

Yanıt / Answer D

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15. $f(x)=\frac{d}{dx}(6\sin 3x\cdot\cos 3x)=\frac{d}{dx}\cdot(3\cdot\sin 6x)$

$=3\cdot 6\cdot\cos 6x=18\cos 6x$

$f\left(\frac{\pi}{18}\right)=18\cdot\cos 6\cdot\frac{\pi}{18}=18\cdot\cos\frac{\pi}{3}=18\cdot\frac{1}{2}=9$

Yanıt / Answer C

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16. $f(x)=\frac{mx+4}{x-1}$, $f'(2)=-5$

$f'(x)=\frac{m\cdot(x-1)-(mx+4)}{(x-1)^2}$

$f'(2)=\frac{m-2m-4}{1}$

$-m-4=-5$

$-m=-1$

$m=1$

Yanıt / Answer C

1. $f(x) = \arcsin(2x-1) \Rightarrow \mathbf{f'(\tfrac{3}{4}) = ?}$

A) $\frac{4}{3}$ B) $\frac{4\sqrt{3}}{3}$ C) $\frac{2\sqrt{3}}{3}$ D) $\frac{8}{3}$ E) $\frac{8\sqrt{3}}{3}$

2. $f(x) = \arctan 2x + \text{arccot}\,x \Rightarrow \mathbf{f'(\sqrt{3}) = ?}$

A) $-\frac{9}{52}$ B) $-\frac{7}{52}$ C) $-\frac{5}{52}$ D) $\frac{9}{52}$ E) $\frac{21}{52}$

3. $f(x) = \arctan(\sin x) \Rightarrow \mathbf{f'(\tfrac{\pi}{3}) = ?}$

A) $\frac{3}{7}$ B) $\frac{2}{7}$ C) $\frac{1}{7}$ D) $\frac{2}{5}$ E) $\frac{1}{5}$

4. $f(x) = \cos(\text{arc}\sin x) \Rightarrow \mathbf{f'(\tfrac{3}{5}) = ?}$

A) $-\frac{3}{4}$ B) $-\frac{3}{5}$ C) $-\frac{4}{5}$

D) $\frac{3}{4}$ E) $\frac{4}{3}$

5. $f(x) = x^3 + \text{arc}\tan x \Rightarrow \mathbf{f''(1) = ?}$

A) $\frac{5}{2}$ B) $\frac{7}{2}$ C) $\frac{9}{2}$ D) $\frac{11}{2}$ E) $\frac{13}{2}$

6. $f(x) = \text{Arcsin}(4x-3) \Rightarrow \mathbf{f'(\tfrac{2}{3}) = ?}$

A) $3\sqrt{2}$ B) $8\sqrt{2}$ C) $9\sqrt{2}$

D) $10\sqrt{2}$ E) $12\sqrt{2}$

7. $f(x) = \arctan(x-2) \Rightarrow \mathbf{f'(-1) = ?}$

A) $-\frac{1}{5}$ B) $-\frac{2}{9}$ C) $\frac{1}{10}$ D) $\frac{1}{5}$ E) $\frac{2}{9}$

8. $f(x) = \arcsin(\sin x) \Rightarrow \mathbf{f(\tfrac{\pi}{6}) = ?}$

A) $\frac{1}{2}$ B) 1 C) $\frac{\sqrt{2}}{2}$ D) $\frac{\sqrt{3}}{2}$ E) $\sqrt{3}$

9. $f(x) = \arcsin(\cos x) \Rightarrow \mathbf{f'(\frac{\pi}{3}) = ?}$

A) -3 B) -2 C) -1 D) 1 E) 2

10. $f(x) = \text{arc}(\tan x)^2 + \text{arccot}x \Rightarrow \mathbf{f(0) = ?}$

A) -3 B) -2 C) -1 D) 1 E) 2

11. $x \in \left[0, \frac{\pi}{2}\right]$,

$f(x) = \arccos(\sin x) \Rightarrow \mathbf{f'(x) = ?}$

A) 1 B) $\frac{1}{2}$ C) $\frac{1}{4}$

D) 0 E) -1

12. $f(x) = \frac{1}{\sqrt{x}}$, $g(x) = \text{arccot}2x \Rightarrow \mathbf{(gof)'(4) = ?}$

A) $-\frac{1}{2}$ B) $\frac{1}{2}$ C) $\frac{1}{3}$

D) $\frac{1}{4}$ E) $\frac{1}{16}$

13. $f(x) = \text{arccot}(\sqrt{x}) \Rightarrow \mathbf{f'(\frac{1}{4}) = ?}$

A) $-\frac{4}{5}$ B) $-\frac{2}{5}$ C) $-\frac{1}{2}$

D) $\frac{2}{5}$ E) $\frac{4}{5}$

14. $f(x) = \arctan x - (\arcsin x)^2 \Rightarrow \mathbf{f'(0) = ?}$

A) -1 B) 0 C) 1

D) 2 E) 3

15. $f(x) = \arctan(\cot x) \Rightarrow \mathbf{f'(x) = ?}$

A) -1 B) 0 C) $\frac{1}{2}$

D) 1 E) 2

16. $f(x) = \text{arccot}\,\frac{1}{x} \Rightarrow \mathbf{f'(1) = ?}$

A) $-\frac{1}{2}$ B) 0 C) $\frac{1}{2}$

D) 1 E) $\frac{3}{2}$

Yanıtlar / Answers

1. B	**4. A**	**7. C**	**10. C**	**13. A**	**16. A**
2. C	**5. D**	**8. B**	**11. E**	**14. C**	
3. B	**6. A**	**9. C**	**12. E**	**15. A**	

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1. $f(x)=\arcsin(2x-1)$

$$f'(x)=\frac{2}{\sqrt{1-(2x-1)^2}}$$

$$f'(\frac{3}{4})=\frac{2}{\sqrt{1-(\frac{3}{2}-1)^2}}=\frac{2}{\sqrt{1-\frac{1}{4}}}=\frac{2}{\sqrt{\frac{3}{4}}}$$

$$f'(\frac{3}{4})=\frac{4}{\sqrt{3}}=\frac{4\sqrt{3}}{3}$$

Yanıt / Answer B

2. $f(x) = \arctan 2x + \operatorname{arccot} x$

$$f'(x)=\frac{2}{1+4x^2}-\frac{1}{1+x^2}$$

$$f'(\sqrt{3})=\frac{2}{1+12}-\frac{1}{1+3}=\frac{2}{13}-\frac{1}{4}$$

$$f'(\sqrt{3})=\frac{8-13}{52}=-\frac{5}{52}$$

Yanıt / Answer C

3. $f(x)=\arctan(\sin x) \Rightarrow f'(x)=\dfrac{\cos x}{1+(\sin x)^2}$

$$f'(\frac{\pi}{3})=\frac{\cos\frac{\pi}{3}}{1+(\sin\frac{\pi}{3})^2}=\frac{\frac{1}{2}}{1+\frac{3}{4}}=\frac{\frac{1}{2}}{\frac{7}{4}}=\frac{1}{2}\cdot\frac{4}{7}=\frac{2}{7}$$

Yanıt / Answer B

4. $f(x)=\cos(\arcsin x) \Rightarrow$

$$f'(x)=\frac{-\cos x}{\sqrt{1-\sin^2 x}}\cdot\sin(\arcsin x)$$

$$=\frac{-\cos x}{\lvert\cos x\rvert}\cdot\sin(\arcsin x)$$

$$f'(x)=-\sin(\arcsin x)=-x$$

$$\Rightarrow f'(\frac{3}{5})=-\frac{3}{5}$$

Yanıt / Answer B

5. $f(x)=x^3+\arctan x$

$$f'(x)=3x^2+\frac{1}{1+x^2}$$

$$f''(x)=6x+\frac{0\cdot(1+x^2)-2x}{(1+x^2)^2}=6x-\frac{2x}{(1+x^2)^2}$$

$$f''(1)=6\cdot1-\frac{2\cdot1}{(1+1)^2}=6-\frac{2}{4}$$

$$=6-\frac{1}{2}=\frac{11}{2}$$

Yanıt / Answer D

6. $f(x)=\arcsin(4x-3)$

$$f'(x)=\frac{4}{\sqrt{1-(4x-3)^2}}$$

$$f'\left(\frac{2}{3}\right)=\frac{4}{\sqrt{1-\left(\frac{8}{3}-3\right)^2}}=\frac{4}{\sqrt{1-\frac{1}{9}}}=\frac{4}{\frac{\sqrt{8}}{3}}$$

$$f'\left(\frac{2}{3}\right)=\frac{12}{2\sqrt{2}}=\frac{6}{\sqrt{2}}=\frac{6\sqrt{2}}{2}=3\sqrt{2}$$

Yanıt / Answer A

7. $f(x)=\arctan(x-2)$

$$f'(x)=\frac{1}{1+(x-2)^2}$$

$$f'(-1)=\frac{1}{1+(-1-2)^2}=\frac{1}{1+9}=\frac{1}{10}$$

Yanıt / Answer C

8. $f(x)=\arcsin(\sin x) \Rightarrow f(x)=x$

$f'(x)=1$

Yanıt / Answer B

9. $f(x)=\arcsin(\cos x)$

$$f'(x)=\frac{-\sin x}{\sqrt{1-(\cos x)^2}}$$

$$f'(\frac{\pi}{3})=\frac{-\sin\frac{\pi}{3}}{\sqrt{1-(\cos\frac{\pi}{3})^2}}=\frac{-\frac{\sqrt{3}}{2}}{\sqrt{1-\frac{1}{4}}}$$

$$=\frac{-\frac{\sqrt{3}}{2}}{\frac{\sqrt{3}}{2}}=-1$$

Yanıt / Answer C

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10. $f(x)=(\arctan x)^2+\operatorname{arccot} x$

$$f'(x)=2\cdot\arctan x\cdot\frac{1}{1+x^2}+\frac{-1}{1+x^2}$$

$$=\frac{2\cdot\arctan x-1}{1+x^2}$$

$$f'(0)=\frac{2\cdot 0-1}{1+0^2}=\frac{-1}{1}=-1$$

Yanıt / Answer C

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11. $f(x)=\arccos(\sin x)$

$$f'(x)=\frac{-\cos x}{\sqrt{1-\sin^2 x}}=\frac{-\cos x}{|\cos x|}$$

$$x\in\left[0,\frac{\pi}{2}\right]\Rightarrow f'(x)=\frac{-\cos x}{\cos x}=-1$$

Yanıt / Answer E

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12. $(g o f)'(x)=g'(f(x))\cdot f'(x)$

$$\left.\begin{array}{l} g'(x)=\dfrac{-2}{1+4x^2} \\ f'(x)=-\dfrac{1}{2\sqrt[3]{x^2}} \end{array}\right\}\Rightarrow (g o f)'(x)=\frac{-2}{1+4\left(\frac{1}{\sqrt{x}}\right)^2}\cdot\frac{-1}{2\sqrt[3]{x^2}}$$

$$\Rightarrow (g o f)'(4)=\frac{-2}{2}\cdot\frac{-1}{16}=\frac{1}{16}$$

Yanıt / Answer E

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13. $f(x)=\operatorname{arccot}(\sqrt{x})$

$$f'(x)=\frac{(\sqrt{x})'}{1+(\sqrt{x})^2}=\frac{\frac{1}{2\sqrt{x}}}{1+x}=\frac{1}{2\sqrt{x}\,(1+x)}$$

$$\Rightarrow f'(\frac{1}{4})=\frac{1}{2\cdot\sqrt{\frac{1}{4}}\cdot(1+\frac{1}{4})}=\frac{4}{5}$$

Yanıt / Answer E

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14. $f(x)=\arctan x-(\arcsin x)^2$

$$f'(x)=\frac{1}{1+x^2}-2\cdot\arcsin x\cdot\frac{1}{\sqrt{1-x^2}}$$

$$\Rightarrow f'(0)=\frac{1}{1+0^2}-2\cdot\arcsin 0\cdot\frac{1}{\sqrt{1-0^2}}=1$$

Yanıt / Answer C

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15. $f(x)=\arctan(\cot x)$

$$f'(x)=\frac{(\cot x)'}{1+\cot^2 x}=\frac{-(1+\cot^2 x)}{(1+\cot^2 x)}=-1$$

Yanıt / Answer A

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16. $f(x)=\operatorname{arccot}\frac{1}{x}$

$$f'(x)=\frac{(\frac{1}{x})'}{1+\left(\frac{1}{x}\right)^2}=\frac{-\frac{1}{x^2}}{1+\frac{1}{x^2}}$$

$$\Rightarrow f'(1)=\frac{-\frac{1}{1}}{1+\frac{1}{1}}=-\frac{1}{2}$$

Yanıt / Answer A

1. $f(x) = \log_2 (x^2 - 1) \Rightarrow \mathbf{f'(2) = ?}$

A) $\frac{1}{3\ln 2}$ B) $\frac{1}{3\ln 2}$ C) $\frac{4}{3\ln 2}$

D) $\frac{1}{2\ln 2}$ E) $\frac{1}{2\ln 2}$

2. $f(x) = x \cdot \ln x + 2x \Rightarrow \mathbf{f'(x) = ?}$

A) lnx B) lnx + 2 C) lnx + 3

D) lnx + 4 E) 2ln x

3. $f(x) = y = \ln(\cos x) \Rightarrow \mathbf{f'(\frac{2\pi}{3}) = ?}$

A) $-\sqrt{3}$ B) $-\frac{1}{\sqrt{3}}$ C) -1 D) $\frac{1}{\sqrt{3}}$ E) $\sqrt{3}$

4. $f(x) = \ln \frac{3x^2 + 1}{2x^3 + x + 2} \Rightarrow \mathbf{f'(-1) = ?}$

A) $\frac{13}{2}$ B) $\frac{11}{2}$ C) $\frac{9}{2}$ D) $\frac{7}{2}$ E) $\frac{5}{2}$

5. $f(x) = \ln(3^{\sin 2x}) \Rightarrow \mathbf{f'(\frac{\pi}{3}) = ?}$

A) $-2\ln 3$ B) $-\ln 3$ C) $\ln 3$

D) $2\ln 3$ E) $3\ln 3$

6. $f(x) = \log_5 (\cos x) \Rightarrow \mathbf{f'(0) = ?}$

A) $-5\log_3 e$ B) $-3\log_3 e$ C) $-\log_3 e$

D) 0 E) $\log_3 e$

7. $f(x) = \ln(\ln x) \Rightarrow \mathbf{f(\frac{1}{e}) = ?}$

A) $\frac{1}{e}$ B) $\frac{1}{2e}$ C) e D) $-$e E) 3e

8. $f(x) = \ln(\sin x) - \frac{1}{2}\sin^2 x \Rightarrow \mathbf{f(\frac{\pi}{4}) = ?}$

A) $\frac{1}{8}$ B) $\frac{1}{6}$ C) $\frac{1}{4}$ D) $\frac{1}{2}$ E) 1

9. $f(x) = \ln(\sin x) \Rightarrow \mathbf{f''(\frac{\pi}{4}) = ?}$

A) -2 B) -1 C) 0 D) 1 E) 2

10. $f(x) = \dfrac{2\ln x}{x-1} \Rightarrow \mathbf{f'(2) = ?}$

A) $1 + \ln 4$ B) $1 - \ln 4$ C) $2 + \ln 4$ D) $2 - \ln 2$ E) $1 - \ln 2$

11. $f(x) = \ln(x^3 - 2x^2 + 1) \Rightarrow \mathbf{f'(2) = ?}$

A) -4 B) -2 C) $\dfrac{4}{3}$ D) $\dfrac{7}{3}$ E) 4

12. $f(x) = \dfrac{\ln x}{x+1} \Rightarrow \mathbf{f'(1) = ?}$

A) $\dfrac{3}{4}$ B) $\dfrac{1}{4}$ C) 1 D) $\dfrac{1}{2}$ E) $\dfrac{1}{3}$

13. $f(x) = \arcsin(\ln x) \Rightarrow \mathbf{f'(1) = ?}$

A) -2 B) -1 C) 0 D) 1 E) 2

14. $f(x) = \arctan(\ln^2 x) \Rightarrow \mathbf{f'(e) = ?}$

A) $\dfrac{1}{2e}$ B) $\dfrac{1}{e}$ C) e D) e^2 E) e^3

15. $f(x) = \arctan(\ln x) \Rightarrow \mathbf{f'\left(\frac{1}{e}\right) = ?}$

A) $-e$ B) $-\dfrac{e}{2}$ C) $\dfrac{e}{2}$ D) e E) 2e

16. k sabit sayı (k, constant)

$$\sqrt{xy} = k \Rightarrow \left.\frac{dy}{dx}\right|_{x=2,\,y=2} = ?$$

A) -2 B) -1 C) 0 D) 1 E) 2

[YTÜ. YÖS 2013]

Yanıtlar / Answers

1. C	4. B	7. D	10. B	13. D	16. B
2. C	5. B	8. D	11. E	14. B	
3. E	6. D	9. A	12. D	15. C	

1. $f(x)=\log_2(x^2-1)$

$$f'(x)=\frac{2x}{x^2-1}\cdot\log_2 e$$

$$f'(2)=\frac{4}{4-1}\cdot\frac{\ln e}{\ln 2}=\frac{4}{3\ln 2}$$

Yanıt / Answer C

2. $f(x) = x\ln x + 2x$

$$f'(x) = 1\cdot\ln x + x\cdot\frac{1}{x} + 2$$

$$= \ln x + 1 + 2 = \ln x + 3$$

Yanıt / Answer C

3. $f(x)=\ln(\cos x)$

$$f'(x)=\frac{-\sin x}{\cos x}=-\tan x$$

$$f'\left(\frac{2\pi}{3}\right)=-\tan\frac{2\pi}{3}=\tan\frac{\pi}{3}=\sqrt{3}$$

Yanıt / Answer E

4. $f(x)=\ln\dfrac{3x^2+1}{2x^3+x+1}=\ln(3x^2+1)-\ln(2x^3+x+2)$

$$f'(x)=\frac{6x}{3x^2+1}-\frac{6x^2+1}{2x^3+x+2}$$

$$f'(-1)=\frac{-6}{3+1}-\frac{6+1}{-2-1+2}=\frac{-6}{4}-\frac{7}{-1}$$

$$f'(-1)=\frac{-3}{2}+\frac{7}{1}=\frac{11}{2}$$

Yanıt / Answer B

5. $f(x)=\ln 3^{\sin 2x}=\sin 2x\cdot\ln 3$

$$f'(x)=2\cdot\cos 2x\cdot\ln 3$$

$$f'\left(\frac{\pi}{3}\right)=2\cdot\cos\frac{2\pi}{3}\cdot\ln 3=2\cdot\left(-\cos\frac{\pi}{3}\right)\cdot\ln 3$$

$$=2\cdot\left(-\frac{1}{2}\right)\cdot\ln 3$$

$$=-\ln 3$$

Yanıt / Answer B

6. $f(x)=\log_5(\cos x)$

$$f'(x)=\frac{-\sin x}{\cos x}\cdot\log_5 e$$

$$f'(0)=\frac{-\sin 0}{\cos 0}\cdot\log_5 e=0$$

Yanıt / Answer D

7. $f(x)=\ln(\ln x)$

$$f'(x)=\frac{\frac{1}{x}}{\ln x}\Rightarrow f'(x)=\frac{1}{x\cdot\ln x}$$

$$f'\left(\frac{1}{e}\right)=\frac{1}{\frac{1}{e}\cdot\ln\frac{1}{e}}$$

$$=\frac{e}{\ln e^{-1}}=\frac{e}{-1\cdot\ln e}=-e$$

Yanıt / Answer D

8. $f(x)=\ln(\sin x)-\dfrac{1}{2}\sin^2 x$

$$f'(x)=\frac{\cos x}{\sin x}-\frac{1}{2}\cdot 2\sin x\cdot\cos x$$

$$f'(x)=\cot x-\frac{1}{2}\sin 2x$$

$$f'\left(\frac{\pi}{4}\right)=\cot\frac{\pi}{4}-\frac{1}{2}\underbrace{\sin\frac{\pi}{2}}_{1}=1-\frac{1}{2}=\frac{1}{2}$$

Yanıt / Answer D

9. $f(x)=\ln(\sin x)$

$$f'(x)=\frac{\cos x}{\sin x}=\cot x$$

$$f''(x)=-[1+\cot^2 x]$$

$$f'(\frac{\pi}{4})=-[1+\underbrace{\cot^2\frac{\pi}{4}}_{1}]=-[1+1]=-2$$

Yanıt / Answer A

10. $f(x)=\dfrac{2\ln x}{x-1}$

$$f'(x)=\frac{2\cdot\frac{1}{x}\cdot(x-1)-2\ln x}{(x-1)^2}$$

$$f'(2)=\frac{2\cdot\frac{1}{2}\cdot(2-1)-2\cdot\ln 2}{(2-1)^2}=\frac{1-2\cdot\ln 2}{1}=1-\ln 4$$

Yanıt / Answer B

11. $f(x)=\ln(x^3-2x^2+1)$

$$f'(x)=\frac{3x^2-4x}{x^3-2x^2+1}$$

$$f'(2)=\frac{3\cdot(2)^2-4\cdot 2}{(2)^3-2\cdot(2)^2+1}=\frac{3\cdot 4-8}{8-2\cdot 4+1}$$

$$=\frac{12-8}{8-8+1}=4$$

Yanıt / Answer E

12. $f(x)=\dfrac{\ln x}{x+1}$

$$f'(x)=\frac{\frac{1}{x}\cdot(x+1)-\ln x}{(x+1)^2}$$

$$f'(1)=\frac{\frac{1}{1}\cdot(1+1)-\ln 1}{(1+1)^2}=\frac{2-0}{4}=\frac{1}{2}$$

Yanıt / Answer D

13. $f(x)=\arcsin(\ln x)$

$$f'(x)=\frac{\frac{1}{x}}{\sqrt{1-(\ln x)^2}}$$

$$f'(1)=\frac{\frac{1}{1}}{\sqrt{1-(\ln 1)^2}}=\frac{1}{\sqrt{1-0}}=1$$

Yanıt / Answer D

14. $f(x)=\arctan(\ln^2 x)$

$$f'(x)=\frac{(2\ln x)\cdot\frac{1}{x}}{1+(\ln^2 x)^2}$$

$$f'(e)=\frac{(2\ln e)\cdot\frac{1}{e}}{1+(\ln e)^4}=\frac{2\cdot\frac{1}{e}}{1+1}=\frac{1}{e}$$

Yanıt / Answer B

15. $f(x)=\arctan(\ln x)$

$$f'(x)=\frac{\frac{1}{x}}{1+(\ln x)^2}$$

$$f'(\frac{1}{e})=\frac{e}{1+\left(\ln\frac{1}{e}\right)^2}=\frac{e}{1+(-1)^2}=\frac{e}{1+1}=\frac{e}{2}$$

Yanıt / Answer C

16. $\sqrt{xy}=k \Rightarrow x^2y^2-k^2=0$

$$\frac{dy}{dx}=-\frac{F_x}{F_y}=-\frac{2xy^2}{2x^2y}$$

$$\Rightarrow \left.\frac{dy}{dx}\right|_{x=2\,,\,y=2}=-1$$

Yanıt / Answer B

1. $f(x) = e^{x^2-1} \Rightarrow$ **$f'(1) = ?$**

A) -2 B) -1 C) 0 D) 1 E) 2

2. $f(x) = e^{3x+2} \Rightarrow$ **$f'(-\frac{2}{3}) = ?$**

A) 1 B) 2 C) 3 D) 4 E) 5

3. $f(x) = e^{x^2-2} \Rightarrow$ **$f'(2) = ?$**

A) $-4e^2$ B) $-2e^2$ C) $-e^2$ D) $2e^2$ E) $4e^2$

4. $f(x) = e^{\sin x} \Rightarrow$ **$f(3\pi) = ?$**

A) -1 B) $-e$ C) 0 D) 1 E) e

5. $f(x) = e^{\tan x+2} \Rightarrow$ **$f(\frac{\pi}{4}) = ?$**

A) e^3 B) $2e^3$ C) $3e^3$ D) $2e$ E) $2e^2$

6. $f(x) = e^x \cdot \sin x \Rightarrow$ **$\frac{f'(x)}{f(x)} = ?$**

A) e^x B) $\frac{e^x}{\sin x}$ C) $1+\tan x$

D) $1+\cot x$ E) $\frac{1}{\sin x}$

7. $e^{-x}\frac{d^2}{dx^2}\left(x^2 \cdot e^x\right) =$ **?**

A) x^2+2x-4 B) x^2+2x+4 C) x^2-2x

D) x^2-4x-2 E) x^2+4x+2

8. $\frac{d^2}{dx^2}(e^x\cos x + x^2) =$ **?**

A) $2(1-e^x)\sin x$ B) $2(1+e^x\cos x)$

C) $2(1-e^x\sin x)$ D) $2e^x\sin x$

E) 2

9. $y = f(x) = 2^{x^2-4x} \Rightarrow$ **$f'(4) = ?$**

A) ln 2 B) 2ln 2 C) 3ln 2 D) 4 ln2 E) 5ln 2

10. $f(x) = 2^{\cos 3x} \Rightarrow$ **$f'(\frac{\pi}{6}) = ?$**

A) –3 ln2 B) –2ln 2 C) 0 D) 2ln 2 E) 3ln 2

11. $f(x) = 2^{\sin x} \Rightarrow$ **$f'(x) = ?$**

A) $2^{\cos x} \cdot \sin x \cdot \ln 2$ B) $2^{\sin x} \cdot \cos x \cdot \ln 2$

C) $-2^{\cos x} \cdot \sin x \cdot \ln 2$ D) $-2^{\sin x} \cdot$ sinxx$\cdot \ln 2$

E) $2^{\sin x} \cdot \sin x \cdot \ln 2$

12. $f(x) = 2^{\sin x} \Rightarrow$ **$f''(\pi) = ?$**

A) ln2 B) 2lnπ C) –ln 2 D) e E) $\ln^2 2$

13. $f(x) = 2^{\frac{\ln x}{x}} \Rightarrow$ **$f'(1) = ?$**

A) –ln2 B) –ln4 C) ln2 D) ln4 E) $\frac{1}{\ln 2}$

14. $f(x) = x^{3x} \Rightarrow$ **$f'(x) = ?$**

A) –1 B) 1 C) 2 D) 3 E) 6

15. $f(x) = x^{\sin x} \Rightarrow$ **$f'(x) = ?$**

A) $-\frac{\pi}{2}$ B) 1 C) $\frac{\pi}{2}$ D) $\frac{\pi^2}{2}$ E) $\frac{\pi^4}{2}$

16. $f(x) = \frac{\sqrt{x}}{e^{2x}}$

$\Rightarrow$ **$f'(1) = ?$**

A) –2e B) $3e^{-2}$ C) $2e^{-2}$ D) $-\frac{3}{2}e^{-2}$ E) 1

[YTÜ-YÖS 2012]

Yanıtlar / Answers

1. E	4. A	7. E	10. A	13. C	16. D
2. C	5. B	8. C	11. B	14. D	
3. E	6. C	9. D	12. E	15. B	

1. $f(x) = e^{x^2-1}$

$f'(x) = 2x\cdot e^{x^2-1}$

$f'(1) = 2\cdot 1\cdot e^{1-1}$

$f'(1) = 2\cdot e^{0}$

$f'(1) = 2\cdot 1 = 2$

Yanıt / Answer E

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2. $f(x)=e^{3x+2}$

$f'(x)=3\cdot e^{3x+2}$

$f'\left(-\frac{2}{3}\right)=3\cdot e^{3\left(-\frac{2}{3}\right)+3}$

$f'\left(-\frac{2}{3}\right)=3\cdot e^{0}=3\cdot 1=3$

Yanıt / Answer C

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3. $f(x)=e^{x^2-2}$

$f'(x)=2x\cdot e^{x^2-2}$

$f'(2)=2\cdot 2\cdot e^{4-2}=4\cdot e^{2}$

Yanıt / Answer E

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4. $f(x)=e^{\sin x}$

$f'(x)=\cos x\cdot e^{\sin x}$

$f'(3\pi)=\cos 3\pi\cdot e^{\sin 3\pi}$

$f'(3\pi)=-1\cdot e^{0}$

$f'(3\pi)=-1\cdot 1$

$f'(3\pi)=-1$

Yanıt / Answer A

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5. $f(x)=e^{\tan x+2}$

$f'(x)=(1+\tan^2 x)\cdot e^{\tan x+2}$

$$f'\left(\frac{\pi}{4}\right)=\left(1+\underbrace{\tan^2\frac{\pi}{4}}_{1}\right)\cdot e^{\tan\frac{\pi}{4}+2}$$

$=(1+1)\cdot e^{1+2}=2e^{3}$

Yanıt / Answer B

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6. $f(x)=e^{x}\cdot\sin x \Rightarrow f'(x)=e^{x}\cdot\sin x+e^{x}\cdot\cos x$

$$\frac{f'(x)}{f(x)}=\frac{e^{x}(\sin x+\cos x)}{e^{x}\cos x}=\frac{\sin x}{\cos x}+\frac{\cos x}{\cos x}$$

$=\tan x+1$

Yanıt / Answer C

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7. $$e^{-x}\frac{d}{dx}\left(2xe^{x}+x^{2}e^{x}\right)=e^{-x}\frac{d}{dx}\left[e^{x}(2x+x^{2})\right]$$

$=e^{-x}\left[e^{x}(2x+x^{2})+e^{x}(2+2x)\right]$

$=e^{-x}\cdot e^{x}\left(2x+x^{2}+2+2x\right)$

$=e^{0}\cdot(x^{2}+4x+2)=x^{2}+4x+2$

Yanıt / Answer E

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8. $$\frac{d^{2}}{dx^{2}}\left(e^{x}\cos x+x^{2}\right)=\frac{d}{dx}\left[e^{x}\cos x-e^{x}\sin x+2x\right]$$

$=\frac{d}{dx}\left[e^{x}(\cos x-\sin x)+2x\right]$

$=e^{x}(\cos x-\sin x)+e^{x}(-\sin x-\cos x)+2$

$=e^{x}(\cos x-\sin x-\sin x-\cos x)+2$

$=-2e^{x}\sin x+2=2(1-e^{x}\sin x)$

Yanıt / Answer C

9. $f(x) = 2^{x^2-4x} \Rightarrow$

$$f'(x) = (2x-4)\cdot 2^{x^2-4x}\cdot \ln 2$$

$$f'(4) = (8-4)\cdot 2^{16-16}\cdot \ln 2$$

$$f'(4) = 4\cdot 2^0\cdot \ln 2 = 4\cdot \ln 2$$

Yanıt / Answer D

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10. $f(x) = 2^{\cos 3x}$

$$f(x)' = -3\cdot \sin 3x\cdot 2^{\cos 3x}\cdot \ln 2$$

$$f'\left(\frac{\pi}{6}\right) = -3\sin\frac{\pi}{2}\cdot 2^{\cos\frac{\pi}{2}}\ln 2$$

$$= -3\cdot 1\cdot 2^0\cdot \ln 2 = -3\ln 2$$

Yanıt / Answer A

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11. $f(x) = 2^{\sin x}$

$$f'(x) = \cos x\cdot 2^{\sin x}\cdot \ln 2$$

Yanıt / Answer B

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12. $f(x) = 2^{\sin x}$

$$f(x)' = \cos x\cdot 2^{\sin x}\cdot \ln 2$$

$$f''(x) = -\sin x\cdot 2^{\sin x}\cdot \ln 2 + \cos^2 x\cdot 2^{\sin x}\cdot (\ln 2)^2$$

$$f''(\pi) = \underbrace{-\sin\pi\cdot 2^{\sin\pi}\cdot \ln 2}_{0} + \cos^2(\pi)\cdot 2^{\sin\pi}\cdot(\ln 2)^2$$

$$= 0 + (-1)^2\cdot 2^0\cdot(\ln 2)^2 = \ln^2 2$$

Yanıt / Answer E

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13. $f(x) = 2^{\frac{\ln x}{x}}$

$$f'(x) = \frac{\frac{1}{x}\cdot x - \ln x}{x^2}\cdot 2^{\frac{\ln x}{x}}\cdot \ln 2$$

$$f'(1) = \frac{1-\ln 1}{(1)^2}\cdot 2^{\frac{\ln 1}{1}}\cdot \ln 2 = \frac{1-0}{1}\cdot 2^0\cdot \ln 2 = \ln 2$$

Yanıt / Answer C

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14. $y = x^{3x} \Rightarrow \ln y = \ln x^{3x}$

$$\ln y = 3x\cdot \ln x$$

$$\frac{y'}{y} = 3\cdot \ln x + \frac{1}{x}\cdot 3x$$

$$y' = x^{3x}(3\cdot \ln x + 3)$$

$$\Rightarrow f'(1) = 3$$

Yanıt / Answer D

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15. $y = x^{\sin x} \Rightarrow \ln y = \sin x\cdot \ln x$

$$\frac{y'}{y} = \cos x\cdot \ln x + \frac{1}{x}\cdot \sin x$$

$$y' = y\cdot\left(\cos x\cdot \ln x + \frac{1}{x}\sin x\right)$$

$$= x^{\sin x}\left(\cos x\cdot \ln x + \frac{1}{x}\sin x\right)$$

$$\Rightarrow f'\left(\frac{\pi}{2}\right) = \frac{\pi}{2}\cdot\left(0 + \frac{2}{\pi}\right) = 1$$

Yanıt / Answer B

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16. $f(x) = \frac{\sqrt{x}}{e^{2x}} \Rightarrow f'(x) = \frac{\frac{1}{2\sqrt{x}}\cdot e^{2x} - 2\cdot e^{2x}\cdot\sqrt{x}}{\left(e^{2x}\right)^2}$

$$= \frac{e^{2x}\left(\frac{1}{2\sqrt{x}} - 2\sqrt{x}\right)}{\left(e^{2x}\right)^2}$$

$$= \frac{\frac{1}{2\sqrt{x}} - 2\sqrt{x}}{e^{2x}}$$

$$f'(1) = \frac{\frac{1}{2\sqrt{1}} - 2\sqrt{1}}{e^{2\cdot 1}} = \frac{-3}{2\cdot e^2} = \frac{-3}{2}\cdot e^{-2}$$

Yanıt / Answer D

1. $f(x) = 2x - 4 \Rightarrow (f^{-1})'(6) = ?$

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{1}{4}$ D) $\frac{1}{5}$ E) $\frac{1}{6}$

2. $f(x) = x^3 - 5 \Rightarrow (f^{-1})'(3) = ?$

A) $\frac{1}{3}$ B) $\frac{1}{4}$ C) $\frac{1}{6}$ D) $\frac{1}{12}$ E) $\frac{1}{15}$

3. $f(3x + 5) = 2x - 3 \Rightarrow (f^{-1})'(2) = ?$

A) $\frac{2}{3}$ B) $\frac{1}{3}$ C) $\frac{3}{2}$ D) $\frac{5}{2}$ E) $\frac{7}{2}$

4. $f: [1, \infty) \to [5, \infty)$

$f(x) = x^2 - 2x + 6 \Rightarrow (f^{-1})'(9) = ?$

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{1}{4}$ D) $\frac{1}{5}$ E) $\frac{1}{6}$

5. $f: R^- \to R^+$

$f(x) = x^2 \Rightarrow (f^{-1})'(4) = ?$

A) $-\frac{3}{4}$ B) $-\frac{1}{2}$ C) $-\frac{1}{4}$ D) $\frac{1}{4}$ E) $\frac{1}{2}$

6. $f: [-5, \infty) \to [-3, \infty)$

$f(x) = \sqrt{x+5} - 3 \Rightarrow (f^{-1})'(2) = ?$

A) 8 B) 10 C) 12 D) 14 E) 16

7. $f(x) = \sqrt[3]{x+3} + 1 \Rightarrow (f^{-1})'(3) = ?$

A) 12 B) 14 C) 16 D) 18 E) 22

8. $f(x) = e^{3x-2} \Rightarrow [f^{-1}(x)]' = ?$

A) $\frac{1}{3e}$ B) $\frac{1}{2e}$ C) $\frac{1}{e}$ D) $\frac{1}{2x}$ E) $\frac{1}{3x}$

9. $f(x) = 2x^3 + 3x \Rightarrow (f^{-1})'(5) = ?$

A) $\frac{1}{4}$ B) $\frac{1}{5}$ C) $\frac{1}{6}$ D) $\frac{1}{8}$ E) $\frac{1}{9}$

10. $f : R - \{-3\} \to R - \{1\},$

$f : x \to y = f(x) = \dfrac{x}{x+3}$

$x = \frac{1}{4} \Rightarrow \frac{d}{dx} f^{-1}(x) = ?$

A) $\frac{4}{3}$ B) 3 C) $\frac{7}{2}$ D) -4 E) $\frac{16}{3}$

11. $f(x) = x^6 + 9 \Rightarrow \dfrac{d^5y}{dx^5} = ?$

A) $6x^5$ B) $30x^2$ C) $4!x$

D) $5!x$ E) $6!x$

12. $f(x) = \sin x - \cos x \Rightarrow \left.\dfrac{d^{62}f(x)}{dx^{62}}\right|_{\pi/2} = ?$

A) -1 B) $-\frac{1}{2}$ C) 0 D) $\frac{1}{2}$ E) 1

13. $f(x) = e^{2x} + x^3 + x^2 + 1 \Rightarrow f^{100}(x) = ?$

A) 2^{100} B) $2^{100} \cdot e^x$ C) $2^{100} \cdot e^{2x}$

D) e^{2x} E) $2 \cdot e^{2x}$

14. $f(x) = x^{-1} \Rightarrow f^{15}(-1) = ?$

A) $-(15!)$ B) $15!$ C) -15

D) 15 E) 0

15. $f(x) = \sin^2 x \Rightarrow f^{45}(x) = ?$

A) $2^{45} \cdot \cos 2x$

B) $-2^{45} \cdot \cos 2x$

C) $-2^{44} \cdot \sin 2x$

D) $2^{44} \cdot \sin 2x$

B) $-2^{45} \cdot \sin 2x$

16. $f(x) = e^x \cdot \sin x$

$f'(0) = ?$

A) -2 B) -1 C) 0 D) 1 E) e

[KTÜ. YÖS 2013]

Yanıtlar / Answers					
1. A	4. C	7. A	10. E	13. B	16. D
2. D	5. C	8. E	11. E	14. A	
3. C	6. B	9. E	12. A	15. D	

1. $f(x)=2x-4 \Rightarrow f^{-1}(2x-4)=x$

$2\cdot f^{-1}(2x-4)=1$

$f^{-1}(2x-4)=\frac{1}{2}$

$2x-4=6 \Rightarrow x=5$

$\Rightarrow f'(6)=\frac{1}{2}$

Yanıt / Answer A

2. $f(x)=x^3-5 \Rightarrow f^{-1}(x^3-5)=x$

$3x^2(f^{-1})'(x^3-5)=1$

$x^3-5=3 \Rightarrow x^3=8$

$x=2$

$(f^{-1})'(3)=\frac{1}{f'(2)} \Rightarrow (f^{-1})'(x)=\frac{1}{3x^2}$

$(f^{-1})'(3)=\frac{1}{3\cdot 4}=\frac{1}{12}$

Yanıt / Answer D

3. $f(3x+5)=2x-3 \Rightarrow f^{-1}(2x-3)=3x+5$

$2\cdot(f^{-1})'(2x-3)=3$

$(f^{-1})'(2x-3)=\frac{3}{2}$

$(f^{-1})'(2)=\frac{3}{2}$

Yanıt / Answer C

4. $x^2-2x+6=9$

$x^2-2x-3=0$

$x=3\ ,\ x=-1$

$\Rightarrow (f^{-1})'(x)=\frac{1}{2x-2}$ ……………**$(x\geq 1)$**

$(f^{-1})'(9)=\frac{1}{f'(3)}=\frac{1}{2\cdot 3-2}=\frac{1}{6-2}=\frac{1}{4}$

Yanıt / Answer C

5. $x^2=4 \Rightarrow x=\pm 2$

$f(x)=x^2 \Rightarrow (f^{-1})'(x)=\frac{1}{2x}$ …………… $(x<0)$

$x=-2 \Rightarrow (f^{-1})'(4)=\frac{1}{2\cdot(-2)}=-\frac{1}{4}$

Yanıt / Answer C

6. $\sqrt{x+5}-3=2 \Rightarrow \sqrt{x+5}=5$

$x+5=25$

$x=20$

$(f^{-1})'(2)=\frac{1}{f'(20)}$

Yanıt / Answer B

7. $f(x)=\sqrt[3]{x+3}+1 \Rightarrow$

$\sqrt[3]{x+3}+1=3$

$\sqrt[3]{x+3}=2$

$x+3=8 \Rightarrow x=5$

$(f^{-1})'(3)=\frac{1}{f'(5)}=\frac{1}{\frac{1}{3\cdot\sqrt[3]{(5+3)^2}}}=12$

Yanıt / Answer A

8. $f(x)=e^{3x-2} \Rightarrow$

$f^{-1}(x)=\frac{2+\ln x}{3}$

$(f^{-1})'(x)=\frac{1}{3}\left[0+\frac{1}{x}\right]=\frac{1}{3x}$

Yanıt / Answer E

9. $2x^3+3x=5 \Rightarrow 2x^3+3x-5=0$

$$(x-1)\cdot(x^2+2x+5)=0$$

$$x=1$$

$$(f^{-1})'(x)=\frac{1}{6x^2+3} \Rightarrow (f^{-1})'(1)=\frac{1}{6\cdot 1+3}=\frac{1}{9}$$

Yanıt / Answer E

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10. $f(x)=\dfrac{x}{x+3} \quad \Rightarrow \quad f^{-1}(x)=\dfrac{-3x}{x-1}$

$$(f^{-1})'(x)=\frac{-3(x-1)+3x\cdot 1}{(x-1)^2}=\frac{-3x+3+3x}{(x-1)^2}=\frac{3}{(x-1)^2}$$

$$(f^{-1})'\left(\frac{1}{4}\right)=\frac{3}{\left(\frac{1}{4}-1\right)^2}=\frac{3}{\frac{9}{16}}=3\cdot\frac{16}{9}=\frac{16}{3}$$

Yanıt / Answer E

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11. $y=f(x)=x^6+9$

$$\frac{dy}{dx}=6x^5$$

$$\frac{d^2y}{dx^2}=6\cdot 5x^4 \quad \Rightarrow \quad \frac{d^3y}{dx^3}=6\cdot 5\cdot 4x^3$$

$$\frac{d^4y}{dx^4}=6\cdot 5\cdot 4\cdot 3x^2 \quad \Rightarrow \quad \frac{d^5y}{dx^5}=6\cdot 5\cdot 4\cdot 3\cdot 2x=6!\cdot x$$

Yanıt / Answer E

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12. $f'(x)=\cos x+\sin x$

$$f''(x)=-\sin x+\cos x$$

$$f'''(x)=-\cos x-\sin x$$

$$f^4(x)=\sin x-\cos x=f(x)$$

$$\begin{array}{r|l} 62 & 4 \\ \cline{2-2} -\ 60 & 15 \\ \hline ② & \end{array} \quad \Rightarrow \quad f^{62}(x)=f''(x)=-\sin x+\cos x$$

$$=-1+0=-1$$

Yanıt / Answer A

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13. $f'(x)=2\cdot e^{2x}+3x^2+2x$

$$f''(x)=2^2\cdot e^{2x}+6x+2$$

$$f'''(x)=2^3\cdot e^{2x}+6$$

$$f^4(x)=2^4\cdot e^{2x}$$

$$\vdots$$

$$f^{100}(x)=2^{100}\cdot e^{2x}$$

Yanıt / Answer B

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14. $f(x)=x^{-1} \Rightarrow f'(x)=-1\cdot x^{-2}$

$$f''(x)=-1\cdot -2\cdot x^3=2\cdot x^{-3}$$

$$f'''(x)=2\cdot -3x^4=-6x^4$$

$$\vdots$$

$$f^{15}(x)=-15!\cdot x^{16}$$

$$f^{15}(-1)=-15!\cdot(-1)^{16}=-15!$$

Yanıt / Answer A

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15. $f(x)=\sin^2 x$

$$f'(x)=2\cdot\sin x\cdot\cos x=\sin 2x$$

$$f''(x)=2\cdot\cos 2x$$

$$f'''(x)=-2^2\cdot\sin 2x$$

$$f^4(x)=-2^3\cdot\cos 2x$$

$$\vdots$$

$$f^{45}(x)=2^{44}\cdot\sin 2x$$

Yanıt / Answer D

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16. $f'(x) = e^x \cdot \sin x + e^x \cdot \cos x$

$$f'(0) = e^0\cdot\sin 0 + e^0\cdot\cos 0$$

$$= 0 + 1$$

$$= 1$$

Yanıt / Answer D

1. $\left.\begin{array}{l} y=4z \\ z=3x \end{array}\right\} \Rightarrow \dfrac{dy}{dx}=?$

A) 6 B) 8 C) 10 D) 12 E) 14

2. $\left.\begin{array}{l} y=m^3-2 \\ m=n^2+1 \\ n=3x-2 \end{array}\right\} \Rightarrow \left.\dfrac{dy}{dx}\right|_{x=1}=?$

A) 15 B) 24 C) 36 D) 48 E) 72

3. $x=t-4,$
$y=t^3-2t+4$
$\Rightarrow \left.\dfrac{dy}{dx}\right|_{x=2}=?$

A) 100 B) 102 C) 104 D) 106 E) 108

4. $x=4t+2,$
$y=t^2+3$
$y=f(x) \Rightarrow f'(4)=?$

A) $\dfrac{1}{4}$ B) $\dfrac{1}{2}$ C) 1 D) 2 E) 4

5. $y=2t^2+3t-1$
$x=\sqrt{t}$
$y=f(x) \Rightarrow f'(1)=?$

A) 28 B) 16 C) 10 D) 8 E) 6

6. $y=3u^4, \quad u=\sqrt{t+2}\ , \ t=x-1 \Rightarrow \left.\dfrac{dy}{dx}\right|_{x=3}=?$

A) 12 B) 15 C) 18
D) 21 E) 24

7. $\left.\begin{array}{l} y=2t^2+1 \\ x=3t-1 \end{array}\right\}, \ y=f(x) \Rightarrow f'(8)=?$

A) 4 B) 5 C) 6 D) 8 E) 10

8. $\left.\begin{array}{l} x=t^3-5t+1 \\ y=3t^2-t \end{array}\right\}, \ t=1 \Rightarrow \dfrac{dy}{dx}=?$

A) $-\dfrac{1}{2}$ B) -1 C) -3 D) -2 E) $-\dfrac{5}{2}$

9. $\left.\begin{array}{l} x=3\sin t \\ y=6\cos t \end{array}\right\},\ t=\frac{\pi}{4} \Rightarrow \frac{dy}{dx}=?$

A) -4 B) -2 C) $-\frac{1}{2}$ D) $-\frac{1}{2}$ E) 2

10. $\left.\begin{array}{l} x=t^2-1 \\ y=t^2+t \end{array}\right\} \Rightarrow \left.\frac{dy}{dx}\right|_{t=-1}=?$

A) -2 B) -1 C) 0 D) $\frac{1}{2}$ E) 1

11. $\left.\begin{array}{l} x=2t+\sin t \\ y=t+\cos 2t \end{array}\right\} \Rightarrow \left.\frac{dy}{dx}\right|_{t=\frac{\pi}{2}}=?$

A) -2 B) -1 C) 0 D) $\frac{1}{2}$ E) 1

12. $\left.\begin{array}{l} u=2x^2-4 \\ y=4u^2 \end{array}\right\} \Rightarrow \left.\frac{dy}{dx}\right|_{x=-1}=?$

A) 8 B) 16 C) 18 D) 32 E) 64

13. $\left.\begin{array}{l} y=3u^2-u \\ x=2u+1 \end{array}\right\},\ y=f(x) \Rightarrow \left.\frac{dy}{dx}\right|_{x=2}=?$

A) -2 B) -1 C) 0 D) 1 E) 2

14. $\left.\begin{array}{l} y=t^3+2t \\ x=t^2+1 \end{array}\right\} \left.\frac{d^2y}{dx^2}\right|_{t=2}=?$

A) $\frac{1}{8}$ B) $\frac{3}{16}$ C) $\frac{1}{4}$ D) $\frac{5}{16}$ E) $\frac{3}{8}$

15. $\left.\begin{array}{l} y=\sin^2 t \\ x=\cos 2t \end{array}\right\} \left.\frac{d^2y}{dx^2}\right|_{t=\pi/4}=?$

A) $-\frac{1}{2}$ B) 0 C) $\frac{1}{2}$ D) $\frac{\sqrt{3}}{2}$ E) 1

16. $\left.\begin{array}{l} y=\ln t \\ x=2t^2 \end{array}\right\} \left.\frac{d^2y}{dx^2}\right|_{t=1}=?$

A) $-\frac{1}{8}$ B) $-\frac{1}{16}$ C) $\frac{1}{16}$

D) $\frac{1}{8}$ E) $\frac{1}{4}$

Yanıtlar / Answers

1. D	4. A	7. A	10. D	13. D	16. A
2. E	5. C	8. C	11. D	14. D	
3. D	6. E	9. B	12. E	15. B	

1. $$\frac{dy}{dx}=\frac{dy}{dz}\cdot\frac{dz}{dx}$$

$$=4\cdot 3$$

Yanıt / Answer D

2. $$\frac{dy}{dx}=\frac{dy}{dm}\cdot\frac{dm}{dn}\cdot\frac{dn}{dx}$$

$$=3m^2\cdot 2n\cdot 3$$

$$=12\cdot 2\cdot 3=72$$

Yanıt / Answer E

3. $$\frac{dy}{dx}=\frac{\frac{dy}{dt}}{\frac{dx}{dt}}=\frac{3t^2-2}{1}$$

$$x=2\ \Rightarrow\ t=6\ \Rightarrow\ \left.\frac{dy}{dx}\right|_{x=2}=\frac{3\cdot 6^2-2}{1}=106$$

Yanıt / Answer D

4. $$f'(4)=\left.\frac{dy}{dx}\right|_{x=4}$$

$$\frac{dy}{dx}=\frac{\frac{dy}{dt}}{\frac{dx}{dt}}=\frac{2t}{4}$$

$$\Rightarrow\left.\frac{dy}{dx}\right|_{x=4}=\frac{2\cdot\frac{1}{2}}{4}=\frac{1}{4}$$

Yanıt / Answer A

5. $$f'(1)=\left.\frac{dy}{dx}\right|_{x=1}$$

$$\frac{dy}{dx}=\frac{\frac{dy}{dt}}{\frac{dx}{dt}}=\frac{2t+3}{\frac{1}{2\sqrt{t}}}$$

$$\Rightarrow\left.\frac{dy}{dx}\right|_{x=1}=\frac{5}{\frac{1}{2}}=10$$

Yanıt / Answer C

6. $$\frac{dy}{dx}=\frac{dy}{du}\cdot\frac{du}{dt}\cdot\frac{dt}{dx}=12u^3\cdot\frac{1}{2\sqrt{t+2}}\cdot 1$$

$$x=3\Rightarrow t=2\Rightarrow\left.\frac{dy}{dx}\right|_{x=3}=12\cdot 8\cdot\frac{1}{4}\cdot 1=24$$

Yanıt / Answer E

7. $$f'(8)=\left.\frac{dy}{dx}\right|_{x=8}$$

$$\frac{dy}{dx}=\frac{\frac{dy}{dt}}{\frac{dx}{dt}}=\frac{4t}{3}$$

$$x=8\Rightarrow\ t=3\Rightarrow\left.\frac{dy}{dx}\right|_{x=8}=\frac{4\cdot 3}{3}=4$$

Yanıt / Answer A

8. $$\left.\begin{aligned}x&=t^3-5t+1\\ y&=3t^2-1\end{aligned}\right\}\Rightarrow\frac{dy}{dx}=\frac{(3t^2-1)'}{(t^3-5t+1)'}=\frac{6t}{3t^2-5}$$

$$\left.\frac{dy}{dx}\right|_{t=1}=\frac{6\cdot 1}{3\cdot 1-5}=\frac{6}{-2}=-3$$

Yanıt / Answer C

9. $$\left.\begin{aligned} x&=3\sin t\\ y&=6\cos t\end{aligned}\right\} \Rightarrow \frac{dy}{dx}=\frac{(6\cos t)'}{(3\sin t)'}=\frac{-6\sin t}{3\cos t}$$

$$\left.\frac{dy}{dx}\right|_{t=\pi/4}=\frac{-2\sin\frac{\pi}{4}}{\cos\frac{\pi}{4}}=\frac{-2\cdot\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}}=-2$$

Yanıt / Answer B

10. $$\left.\begin{aligned} x&=t^2-1\\ y&=t^2+t\end{aligned}\right\} \Rightarrow \frac{dy}{dx}=\frac{(t^2+t)'}{(t^2-1)'}=\frac{2t+1}{2t}$$

$$\left.\frac{dy}{dx}\right|_{t=-1}=\frac{-2+1}{-2}=\frac{-1}{-2}=\frac{1}{2}$$

Yanıt / Answer D

11. $$\left.\begin{aligned} x&=2t+\sin t\\ y&=t+\cos 2t\end{aligned}\right\} \Rightarrow \frac{dy}{dx}=\frac{(t+\cos 2t)'}{(2t+\sin t)'}=\frac{1-2\sin 2t}{2+\cos t}$$

$$\left.\frac{dy}{dx}\right|_{t=\pi/2}=\frac{1-2\sin\pi}{2+\cos\frac{\pi}{2}}=\frac{1-2\cdot 0}{2+0}=\frac{1}{2}$$

Yanıt / Answer D

12. $$\frac{dy}{dx}=\frac{dy}{du}\cdot\frac{du}{dx}=8u\cdot 4x$$

$$x=-1\Rightarrow u=-2\Rightarrow \left.\frac{dy}{dx}\right|_{x=-1}=-16\cdot -4=64$$

Yanıt / Answer E

13. $$\frac{dy}{dx}=\frac{(3u^2-u)'}{(2u+1)'}=\frac{6u-1}{2}$$

$$x=2\Rightarrow u=\frac{1}{2}$$

$$\left.\frac{dy}{dx}\right|_{x=2}=\frac{6\cdot\frac{1}{2}-1}{2}=1$$

Yanıt / Answer D

14. $$\frac{d^2y}{dx^2}=\frac{y''(t)\cdot x'(t)-x''(t)\cdot y'(t)}{(x'(t))^3}$$

$$\left.\begin{aligned} y'&=3t^2+2\\ y''&=6t\\ x'&=2t\\ x''&=2\end{aligned}\right\} \Rightarrow \frac{d^2y}{dx^2}=\frac{6t\cdot 2t-2\cdot(3t^2+2)}{(2t)^3}=\frac{12t^2-6t-4}{8t^3}$$

$$\left.\frac{d^2y}{dx^2}\right|_{t=2}=\frac{20}{64}=\frac{5}{16}$$

Yanıt / Answer D

15. $$\frac{d^2y}{dx^2}=\frac{y''(t)\cdot x'(t)-x''(t)\cdot y'(t)}{(x'(t))^3}$$

$$\left.\begin{aligned} y'&=\sin 2t\\ y''&=2\cos 2t\\ x'&=-2\sin 2t\\ x''&=-4\cos 2t\end{aligned}\right\} \Rightarrow \frac{d^2y}{dx^2}=\frac{2\cos 2t\cdot(-2)\cdot\sin 2t+4\cos 2t+\sin 2t}{(-2\cdot\sin 2t)^3}$$

$$\left.\frac{d^2y}{dx^2}\right|_{t=\pi/4}=\frac{-4\cos\frac{\pi}{2}\cdot\sin\frac{\pi}{2}+4\cos\frac{\pi}{2}\cdot\sin\frac{\pi}{2}}{8t^3}=0$$

Yanıt / Answer B

16. $$\frac{d^2y}{dx^2}=\frac{y''(t)\cdot x'(t)-x''(t)\cdot y'(t)}{(x'(t))^3}$$

$$\left.\begin{aligned} y'&=\frac{1}{t}\\ y''&=-\frac{1}{t^2}\\ x'&=-4x\\ x''&=4\end{aligned}\right\} \Rightarrow \frac{d^2y}{dx^2}=\frac{\frac{-1}{t^2}\cdot 4t-4\cdot\frac{1}{t}}{(4t)^3}=\frac{-8}{64}=-\frac{1}{8}$$

Yanıt / Answer A

1. $F(x, y) = x^2 + y^2 + 5xy + 3 = 0 \;\Rightarrow\; \left.\dfrac{dy}{dx}\right|_{(1,1)} = ?$

A) –2 B) –1 C) 1 D) 2 E) 3

2. $F(x, y) = 4y - 2x + 3xy - 5 \;\Rightarrow\; \left.\dfrac{dy}{dx}\right|_{(-1,2)} = ?$

A) –4 B) –3 C) –2 D) 2 E) 4

3. $F(x, y) = x \cdot y - x^2 + y - 3 = 0 \;\Rightarrow\; \left.\dfrac{dy}{dx}\right|_{(-2,-7)} = ?$

A) –4 B) –3 C) –2 D) 2 E) 3

4. $F(x, y) = x^3 - 3x^2y + y^2 + 1 = 0 \;\Rightarrow\; F'(1, 2) = ?$

A) 4 B) 5 C) 6 D) 9 E) 10

5. $F(x, y) = x^2y + xy^2 + x^3y = 0 \;\Rightarrow\; f'(1, 1) = ?$

A) $-\frac{5}{2}$ B) $-\frac{3}{2}$ C) $-\frac{2}{3}$ D) $-\frac{1}{2}$ E) $-\frac{4}{3}$

6. $x^2y^2 + x^3 - y^2 + 3y + 5 = 0,\; x = 1 \Rightarrow \dfrac{dy}{dx} = ?$

A) $-\frac{11}{3}$ B) $-\frac{13}{3}$ C) $-\frac{5}{3}$ D) $-\frac{1}{3}$ E) -1

7. $y^2 + 2x^2 - 2xy + 3x - y = 0$

$\Rightarrow \left.\dfrac{dy}{dx}\right|_{(1,2)} = ?$

A) –3 B) –2 C) 1 D) 2 E) 3

8. $F(x, y) = x^2 - 3xy + y^2 - 2x + y = 0 \;\Rightarrow\; F'(1, 2) = ?$

A) -3 B) $-\frac{3}{2}$ C) $-\frac{1}{2}$ D) $\frac{3}{2}$ E) 3

9. $y\sqrt{x}-2x=0 \quad \Rightarrow \quad y'=?$

A) $\frac{1}{2}$ B) $\frac{1}{\sqrt{x}}$ C) $-\frac{1}{\sqrt{x}}$ D) $\frac{2}{\sqrt{x}}$ E) $2x$

10. $5^y=\cos x \quad \Rightarrow \quad \left.\frac{dy}{dx}\right|_{\pi/2}=?$

A) $\frac{\cot x+2}{\ln 5}$ B) $5\cot x$ C) $-\frac{\tan x}{\ln 5}$

D) $\frac{\tan x}{\ln 5}$ E) $\frac{1}{\ln 5}$

11. $3\cos x-2\sin y+3x-4y=0$

$\Rightarrow \left.\frac{dy}{dx}\right|_{\left(\frac{\pi}{2},\pi\right)}=?$

A) -2 B) -1 C) $-\frac{1}{2}$ D) 0 E) 1

12. $y^2=e^{x+y} \Rightarrow \frac{d^2y}{dx^2}=?$

A) $\frac{2}{(2-y)^3}$ B) $\frac{2y}{(2-y)^3}$ C) $\frac{y}{\left(1+y^2\right)^2}$

D) $\frac{4y}{(1+y)^3}$ E) $\frac{4y}{(1-y)^3}$

13. $f(x,y)=x^y+y^x+5=0 \Rightarrow \left.\frac{dy}{dx}\right|_{(1,1)}=?$

A) -1 B) 0 C) $\frac{1}{2}$

D) 1 E) $\ln 2$

14. $f(x,y)=x\cdot y+e^{x+y}=0 \Rightarrow \left.\frac{dy}{dx}\right|_{(1,1)}=?$

A) e^{-2} B) -1 C) 0 D) e E) e^2

15. $x\cdot\sin x-\ln y+3x=0$

$\Rightarrow \left.\frac{dy}{dx}\right|_{x=0}=?$

A) 0 B) 1 C) -2

D) 3 E) -4

16. $3x^3-x-2y^2=0$

$\Rightarrow \left.\frac{dy}{dx}\right|_{x=1,\ y=2}=?$

A) -2 B) -1 C) 1

D) 2 E) 0

[AKDENİZ ÜNV. YÖS 2013]

Yanıtlar / Answers

1. B	4. D	7. A	10. C	13. A	16. C
2. A	5. B	8. E	11. D	14. B	
3. E	6. A	9. B	12. A	15. D	

1. $f(x,y)=x^2+y^2+5xy+3\ ,\ \left(f(x,y)=0 \Rightarrow f'(x,y)=-\dfrac{f'_x}{f'_y}\right)$

$$\left.\begin{aligned} f'_x &= 2x+5y \\ f'_y &= 2y+5x \end{aligned}\right\} \Rightarrow f'(x,y)=-\frac{2x+5y}{2y+5x}$$

$$f'(1,1)=-\frac{2+5}{2+5}=-\frac{7}{7}=-1$$

Yanıt / Answer B

2. $f(x,y)=4y-2x+3xy-5$

$$\left.\begin{aligned} f'_x &= -2+3y \\ f'_y &= 4+3x \end{aligned}\right\} \Rightarrow f'(x,y)=-\frac{3y-2}{4+3x}$$

$$f'(-1,2)=-\frac{6-2}{4-3}$$

$$f'(-1,2)=-\frac{4}{1}=-4$$

Yanıt / Answer A

3. $f(x,y)=xy-x^2+y-3=0$

$$\left.\begin{aligned} f'_x &= y-2x \\ f'_y &= x+1 \end{aligned}\right\} \Rightarrow f'(x,y)=-\frac{y-2x}{x+1}$$

$$f'(-2,-7)=-\frac{-7+4}{-2+1}=-\frac{-3}{-1}=3$$

Yanıt / Answer E

4. $F(x,y)=x^3-3x^2y+y^2+1=0$

$$\left.\begin{aligned} f'_x &= 3x^2-6xy \\ f'_y &= -3x^2+2y \end{aligned}\right\} \Rightarrow F'(x,y)=-\frac{3x^2-6xy}{3y-3x^2}$$

$$F'(1,2)=-\frac{3\cdot1-6\cdot2\cdot1}{4-3}$$

$$=-\frac{3-12}{\ }=9$$

Yanıt / Answer D

5. $f(x,y)=x^2y+xy^2+x^3y=0 \Rightarrow \begin{cases} f'_x=2xy+y^2+3x^2y \\ f'_y=x^2+2xy+x^3 \end{cases}$

$$\Rightarrow f'(x,y)=-\frac{2xy+y^2+3x^2y}{x^2+2xy+x^3}$$

$$f'(1,1)=-\frac{2\cdot1\cdot1+1+3\cdot1\cdot1}{1+2\cdot1\cdot1+1}=-\frac{2+1+3}{1+2+1}$$

$$f'(1,1)=\frac{-6}{4}=-\frac{3}{2}$$

Yanıt / Answer B

6. $x=1 \Rightarrow y^2+1-y^2+3y+5=0$

$$\Rightarrow 3y+6=0 \Rightarrow y=-2$$

$$\left.\begin{aligned} f'_x &= 2xy^2+3x^2 \\ f'_y &= 2x^2y-2y+3 \end{aligned}\right\} \Rightarrow f'(x,y)=-\frac{2xy^2+3x^2}{2x^2y-2y+3}$$

$$f'(1,-2)=-\frac{2\cdot1\cdot(-2)^2+3\cdot1}{2\cdot1\cdot(-2)-2(-2)+3}$$

$$=-\frac{8+3}{-4+4+3}=-\frac{11}{3}$$

Yanıt / Answer A

7. $y^2+2x^2-2xy+3x-y=0 \Rightarrow \begin{cases} f'x=4x-2y+3 \\ f'y=2y-2x-1 \end{cases}$

$$\Rightarrow f'(x,y)=-\frac{4x-2y+3}{2y-2x-1}$$

$$f'(1,2)=-\frac{4-4+3}{4-2-1}=\frac{3}{-1}=-3$$

Yanıt / Answer A

8. $f(x,y)=x^2-3xy+y^2-2x+y=0$

$$\left.\begin{aligned} f_x &= 2x-3y-2 \\ f_y &= -3x+2y+1 \end{aligned}\right\} \Rightarrow$$

$$f'(x,y)=-\frac{2x-3y-2}{-3x+2y+1}$$

$$f'(1,2)=-\frac{2\cdot1-3\cdot2-2}{-3\cdot1+2\cdot2+1}=-\frac{2-6-2}{-3+4+1}=-\frac{-6}{2}=3$$

Yanıt / Answer E

9. $y\sqrt{x}-2x=0 \Rightarrow y\sqrt{x}=2x$

$$y=\frac{2x}{\sqrt{x}}=\frac{2x\sqrt{x}}{x}$$

$$y=2\sqrt{x} \Rightarrow y'=2\cdot\frac{1}{2\sqrt{x}}=\frac{1}{\sqrt{x}}$$

Yanıt / Answer B

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10. $5^y=\cos x=0$

$$\frac{dy}{dx}=\frac{f'_x}{f'y}=-\frac{\sin x}{5^y\cdot\ln5}$$

$$=-\frac{\sin x}{\cos x\cdot\ln5}$$

$$=-\frac{\sin x}{\cos x\cdot\ln5}=-\frac{\tan x}{\ln5}$$

Yanıt / Answer C

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11. $3\cos x-2\sin y+3x-4y=0$

$f'x=-3\sin x+3$

$f'y=-2\cos y-4$

$$\frac{dy}{dx}=-\frac{3-3\sin x}{-(2\cos y+4)}=\frac{3-3\sin x}{2\cos y+4}$$

$$\frac{dy}{dx}\left(\frac{\pi}{2},\pi\right)=\frac{3-3\sin\frac{\pi}{2}}{2\cos\pi+4}=\frac{3-3\cdot1}{2(-1)+4}=\frac{0}{2}=0$$

Yanıt / Answer D

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12. $y^2-e^{x+y}=0 \Rightarrow \begin{cases} f'x=-e^{x+y}=-y^2 \\ f'y=2y-e^{x+y}=2y-y^2 \end{cases}$

$$\Rightarrow \frac{dy}{dx}=\frac{+y^2}{2y-y^2}=\frac{+y}{2-y}$$

$$\Rightarrow \frac{d^2y}{dx^2}=\frac{d}{dx}\left(\frac{dx}{dy}\right)=\frac{\left(\frac{y}{2-y}\right)'}{2-y}=\frac{2}{(2-y)^3}$$

Yanıt / Answer A

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13. $\dfrac{dy}{dx}=-\dfrac{f'_x}{f'y}$

$$\left.\begin{aligned} f'_x&=y\cdot x^{y-1}+y^x\cdot\ln y \\ f'_y&=y^x\cdot\ln y+x\cdot y^{x-1} \end{aligned}\right\} \Rightarrow \frac{dy}{dx}=-\frac{y\cdot x^{y-1}+y^x\cdot\ln y}{y^x\cdot\ln y+x\cdot y^{x-1}}$$

$$\Rightarrow \left.\frac{dy}{dx}\right|_{(1,1)}=-\frac{1\cdot1^0+1^1\cdot\ln1}{1^1\cdot\ln1+1\cdot y^0}=-1$$

Yanıt / Answer A

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14. $\dfrac{dy}{dx}=-\dfrac{f'_x}{f'y}$

$$=\frac{y+e^{x+y}}{x+e^{x+y}}$$

$$\Rightarrow \left.\frac{dy}{dx}\right|_{(1,1)}=-\frac{1+e^2}{1+e^2}=-1$$

Yanıt / Answer B

---

15. $\dfrac{dy}{dx}=-\dfrac{\sin x+\cos x\cdot x+3}{-\dfrac{1}{y}}$

$$=y\cdot(\sin x+\cos x\cdot x+3$$

$x=0 \Rightarrow 0\cdot\sin0-\ln y+3\cdot0=0$

$\ln y=0$

$y=1$

$$\left.\frac{dy}{dx}\right|_{(0,1)}=1\cdot(\sin0+\cos0\cdot0+3)=3$$

Yanıt / Answer D

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16. $\left.\dfrac{dy}{dx}\right|_{x=1,\ y=2} \Rightarrow -\dfrac{9x^2-1}{-4y}=\dfrac{9-1}{4\cdot2}=\dfrac{8}{8}=1$

Yanıt / Answer C

1. $\lim\limits_{x \to 0} \dfrac{\ln e^{x} - x^{2}}{\sin 2x} = ?$

A) 0 B) $\frac{2}{3}$ C) $\frac{1}{2}$ D) 1 E) $\frac{3}{2}$

2. $\lim\limits_{x \to \frac{\pi}{2}} \dfrac{e^{\cos x} - 1}{2\cos x} = ?$

A) -1 B) $-\frac{1}{2}$ C) 0 D) $\frac{1}{2}$ E) 1

3. $\lim\limits_{x \to 2} \dfrac{2x^{3} - x^{2} + x - 14}{x^{4} + x - 18} = ?$

A) $\frac{5}{11}$ B) $\frac{7}{11}$ C) $\frac{5}{9}$ D) $\frac{7}{9}$ E) $\frac{8}{7}$

4. $\lim\limits_{x \to 0} \dfrac{x - \sin 3x}{x + \sin 2x} = ?$

A) $-\frac{4}{3}$ B) -1 C) $-\frac{2}{3}$ D) $-\frac{1}{3}$ E) $-\frac{3}{2}$

5. $\lim\limits_{x \to 3} \dfrac{\tan(x^{2} - 9)}{x - 3} = ?$

A) 3 B) 4 C) 5 D) 6 E) 7

6. $\lim\limits_{x \to \frac{\pi}{4}} \dfrac{\cot x - 1}{\sin x - \cos x} = ?$

A) $-2\sqrt{2}$ B) $-\sqrt{2}$ C) $\sqrt{2}$ D) $2\sqrt{2}$ E) $\frac{\sqrt{2}}{2}$

7. $\lim\limits_{x \to -1} \left(\dfrac{x^{2} + 2x + 1}{x^{2} - x - 2} \right) = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

8. $\lim\limits_{x \to \frac{\pi}{8}} \dfrac{\tan 2x - 1}{\cos^{2} 2x - \sin^{2} 2x} = ?$

A) 1 B) 2 C) $\frac{1}{2}$ D) $-\frac{1}{2}$ E) -1

9. $\lim\limits_{x \to \frac{\pi}{2}} \dfrac{\sin(\cos x)}{\cos x} = ?$

A) -1 B) $-\dfrac{1}{2}$ C) 0 D) 1 E) $\dfrac{1}{2}$

10. $\lim\limits_{x \to 0} \dfrac{\tan x - x}{x - \sin x} = ?$

A) $\dfrac{1}{2}$ B) $\dfrac{2}{3}$ C) 1 D) $\dfrac{3}{2}$ E) 2

11. $\lim\limits_{x \to \infty} \dfrac{e^{2x}}{4x^2 + 4x} = ?$

A) $-\infty$ B) -1 C) 0 D) 1 E) ∞

12. $\lim\limits_{x \to 1} \dfrac{\ln x^2 - \ln^2 x}{x^2 - 1} = ?$

A) 0 B) 1 C) 2 D) $\dfrac{3}{2}$ E) 3

13. $\lim\limits_{x \to 1} \dfrac{x^2 + x - 2}{\ln x} = ?$

A) 1 B) 2 C) 3 D) 4 E) 6

14. $\lim\limits_{x \to 0} \dfrac{\ln e^x - x^2}{\sin 2x} = ?$

A) $-\dfrac{1}{2}$ B) 0 C) $\dfrac{1}{2}$ D) 1 E) $\dfrac{3}{2}$

15. $\lim\limits_{x \to \frac{\pi}{2}} \dfrac{\cos 2x + 1}{1 - \sin x} = ?$

A) -4 B) -2 C) 0 D) 2 E) 4

16. $\lim\limits_{x \to k} \dfrac{x^4 - k^4}{x^2 - k^2} = ?$

A) k B) $3k^2$ C) $2k^2$ D) k^2 E) $2k$

[YTÜ. YÖS 2012]

Yanıtlar / Answers					
1. C	4. C	7. C	10. E	13. C	16. C
2. D	5. D	8. E	11. C	14. C	
3. B	6. B	9. D	12. B	15. E	

1.

$$\lim_{x\to 0}\frac{\ln e^x - x^2}{\sin 2x}=\lim_{x\to 0}\frac{x\cdot\ln e - x^2}{\sin 2x}=\lim_{x\to 0}\frac{x-x^2}{\sin 2x}\left(\frac{0}{0}\right)$$

$$\Rightarrow \lim_{x\to 0}\frac{(x-x^2)'}{(\sin 2x)'}=\lim_{x\to 0}\frac{1-2x}{2\cdot\cos 2x}=\frac{1-2\cdot 0}{2\cdot\underbrace{\cos 0}_{1}}=\frac{1}{2}$$

Yanıt / Answer C

2.

$$\lim_{x\to\frac{\pi}{2}}\frac{e^{\cos x}-1}{2\cos x}\left(\frac{0}{0}\right)\Rightarrow$$

$$\lim_{x\to\frac{\pi}{2}}\frac{(e^{\cos x}-1)'}{(2\cos x)'}=\lim_{x\to\frac{\pi}{2}}\frac{-\sin x\cdot e^{\cos x}}{-2\sin x}=\frac{-\sin\frac{\pi}{2}\cdot e^{\cos\frac{\pi}{2}}}{-2\sin\frac{\pi}{2}}$$

$$=\frac{1\cdot e^0}{2\cdot 1}=\frac{1}{2}$$

Yanıt / Answer D

3.

$$\lim_{x\to 2}\frac{2x^3-x^2+x-14}{x^4+x-18}\left(\frac{0}{0}\right)$$

$$\Rightarrow \lim_{x\to 2}\frac{(2x^3-x^2+x-14)'}{(x^4+x-18)'}$$

$$=\lim_{x\to 2}\frac{6x^2-2x+1}{4x^3+1}$$

$$=\frac{6\cdot(2)^2-2\cdot(2)+1}{4\cdot(2)^3+1}$$

$$=\frac{6\cdot 4-2\cdot 2+1}{4\cdot 8+1}=\frac{24-4+1}{33}=\frac{21}{33}=\frac{7}{11}$$

Yanıt / Answer B

4.

$$\lim_{x\to 0}\frac{x-\sin 3x}{x+\sin 2x}\left(\frac{0}{0}\right)\Rightarrow$$

$$\lim_{x\to 0}\frac{(x-\sin 3x)'}{(x+\sin 2x)'}=\lim_{x\to 0}\frac{1-3\cdot\cos 3x}{1+2\cdot\cos 2x}$$

$$=\frac{1-3\cdot\cos 0}{1+2\cdot\underbrace{\cos 0}_{1}}=\frac{1-3}{1+2}=-\frac{2}{3}$$

Yanıt / Answer C

5.

$$\lim_{x\to 3}\frac{\tan(x^2-9)}{x-3}\left(\frac{0}{0}\right)\Rightarrow$$

$$\lim_{x\to 3}\frac{[\tan(x^2-9)]'}{(x-3)'}=\lim_{x\to 3}\frac{2x\cdot[1+\tan^2(x^2-9)]}{1}$$

$$=2\cdot 3\cdot[1+\tan^2 0]=6\cdot[1+0]=6$$

Yanıt / Answer D

6.

$$\lim_{x\to\frac{\pi}{4}}\frac{\cot x-1}{\sin x-\cos x}\left(\frac{0}{0}\right)\Rightarrow$$

$$\lim_{x\to\frac{\pi}{4}}\frac{(\cot x-1)'}{(\sin x-\cos x)'}=\lim_{x\to\frac{\pi}{4}}\frac{-[1+\cot^2 x]}{\cos x+\sin x}$$

$$=\frac{-[1+\cot^2\frac{\pi}{4}]}{\cos\frac{\pi}{4}+\sin\frac{\pi}{4}}$$

$$=\frac{-[1+1]}{\frac{1}{\sqrt{2}}+\frac{1}{\sqrt{2}}}=\frac{-2}{\frac{2}{\sqrt{2}}}=-\sqrt{2}$$

Yanıt / Answer B

7.

$$\lim_{x\to -1}\left(\frac{x^2+2x+1}{x^2-x-2}\right)\left(\frac{0}{0}\right)$$

$$\Rightarrow \lim_{x\to -1}\frac{(x^2+2x+1)'}{(x^2-x-2)'}$$

$$=\lim_{x\to -1}\left(\frac{2x+2}{2x-1}\right)$$

$$=\frac{2\cdot(-1)+2}{2\cdot(-1)-1}=\frac{0}{-3}=0$$

Yanıt / Answer C

8.

$$\lim_{x\to\frac{\pi}{8}}\frac{\tan 2x-1}{\cos^2 2x-\sin^2 2x}\left(\frac{0}{0}\right)\Rightarrow$$

$$\lim_{x\to\frac{\pi}{8}}\frac{(\tan 2x-1)'}{(\cos 4x)'}=\lim_{x\to\frac{\pi}{8}}\frac{2\cdot\left[1+\tan^2 2x\right]}{-4\cdot\sin 4x}$$

$$=\frac{2\cdot\left[1+\tan^2\frac{\pi}{4}\right]}{-4\cdot\sin\frac{\pi}{2}}$$

$$=\frac{2\cdot[1+1]}{-4\cdot 1}=\frac{4}{-4}=-1$$

Yanıt / Answer E

9. $\lim\limits_{x\to\frac{\pi}{2}} \frac{\sin\cdot(\cos x)}{\cos x}\left(\frac{0}{0}\right)$

$$\lim_{x\to\frac{\pi}{2}}\frac{[\sin\cdot(\cos x)]'}{(\cos x)'} = \lim_{x\to\frac{\pi}{2}}\frac{-\sin x\cdot\cos(\cos x)}{-\sin x}$$

$$= \lim_{x\to\frac{\pi}{2}}\cos(\cos x)$$

$$=\cos(\cos\frac{\pi}{2})=\cos 0°=1$$

Yanıt / Answer D

10. $\lim\limits_{x\to0}\frac{\tan x - x}{x-\sin x}\left(\frac{0}{0}\right)\Rightarrow$

$$\lim_{x\to0}\frac{(\tan x-x)'}{(x-\sin x)'}=\lim_{x\to0}\frac{(1+\tan^2 x)-1}{1-\cos x}$$

$$=\lim_{x\to0}\frac{2\tan x\cdot[1+\tan^2 x)}{\sin x}$$

$$=\lim_{x\to0}\frac{\frac{2\cdot\sin x}{\cos x}\cdot\frac{1}{\cos^2 x}}{\sin x}$$

$$=\lim_{x\to0}\frac{3}{\cos^3 x}=\lim_{x\to0}\frac{2}{\underbrace{\cos^3 0}_{1}}=\frac{2}{1}=2$$

Yanıt / Answer E

11. $\lim\limits_{x\to\infty}\frac{e^{2x}}{4x^2+4x}\left(\frac{\infty}{\infty}\right)$

$$=\lim_{x\to\infty}\frac{2\cdot e^{2x}}{8x+4}\left(\frac{\infty}{\infty}\right)$$

$$=\lim_{x\to\infty}\frac{4e^{2x}}{8}=\infty$$

Yanıt / Answer C

12. $\lim\limits_{x\to1}\frac{\ln x^2-\ln^2 x}{x^2-1}=\frac{2\ln x-\ln^2 x}{x^2-1}\left(\frac{0}{0}\right)\Rightarrow$

$$\lim_{x\to1}\frac{(2\ln x-\ln^2 x)'}{(x^2-1)'}=\lim_{x\to1}\frac{2\cdot\frac{1}{x}-2\cdot\ln x\cdot\frac{1}{x}}{2x}$$

$$=\frac{2\cdot\frac{1}{1}+2\ln1\cdot1}{2\cdot1}$$

$$=\frac{2-2\cdot0}{2}=\frac{2}{2}=1$$

Yanıt / Answer B

13. $\lim\limits_{x\to1}\frac{x^2+x-2}{\ln x}\left(\frac{0}{0}\right)\Rightarrow$

$$\lim_{x\to1}\frac{(x^2+x-2)'}{(\ln x)'}=\lim_{x\to1}\frac{2x+1}{\frac{1}{x}}$$

$$=\lim_{x\to1}(2x^2+x)$$

$$=2\cdot1+1=3$$

Yanıt / Answer C

14. $\lim\limits_{x\to0}\frac{x\cdot\ln e-x^2}{\sin2x}=\lim\limits_{x\to0}\frac{x-x^2}{\sin 2x}\left(\frac{0}{0}\right)\Rightarrow$

$$\lim_{x\to0}\frac{(x-x^2)'}{(\sin2x)'}=\lim_{x\to0}\frac{1-2x}{2\cos2x}$$

$$=\frac{1-0}{2\cdot\underbrace{\cos0}_{1}}=\frac{1}{2}$$

Yanıt / Answer C

15. $\lim\limits_{x\to\frac{\pi}{2}}\frac{\cos2x+1}{1-\sin x}\left(\frac{0}{0}\right)\Rightarrow$

$$\lim_{x\to\frac{\pi}{2}}\frac{(\cos2x+1)'}{(1-\sin x)'}=\lim_{x\to\frac{\pi}{2}}\frac{-2\sin2x}{-\cos x}$$

$$=\lim_{x\to\frac{\pi}{2}}\frac{-4\sin x\cdot\cos x}{-\cos x}$$

$$=\lim_{x\to\frac{\pi}{2}}4\sin x=4\cdot\underbrace{\sin\frac{\pi}{2}}_{1}=4$$

Yanıt / Answer E

16. $\lim\limits_{x\to k}\frac{x^4-k^4}{x^2-k^2}\left(\frac{0}{0}\right)$

$$\lim_{x\to k}\frac{x^4-k^4}{x^2-k^2}=\lim_{x\to k}\frac{4x^3}{2x}$$

$$=\frac{4k^3}{2\cdot k}=2k^2$$

Yanıt / Answer C

1. **$f'(3) = ?$**

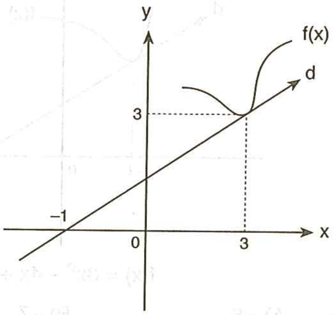
A) $\frac{1}{4}$

B) $\frac{1}{2}$

C) $\frac{3}{4}$

D) 1

E) $\frac{5}{4}$



2. $h(x) = f(x) \cdot x^2$

$\Rightarrow h'(2) = ?$

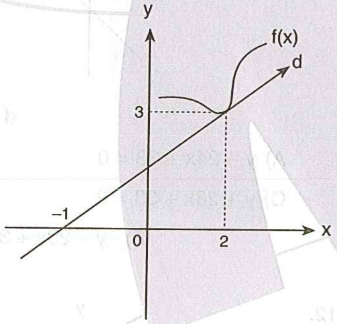
A) 4

B) 8

C) 12

D) 16

E) 20



3. $h(x) = (x^2 + 2) \cdot f(x)$

$\Rightarrow h'(4) = ?$

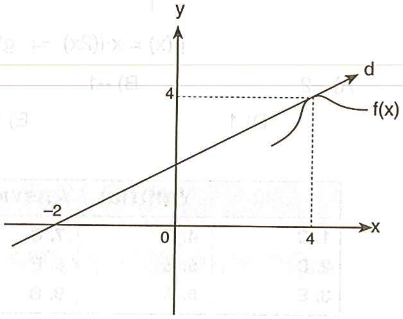
A) 12

B) 22

C) 32

D) 42

E) 44



4. **$a + b = ?$**

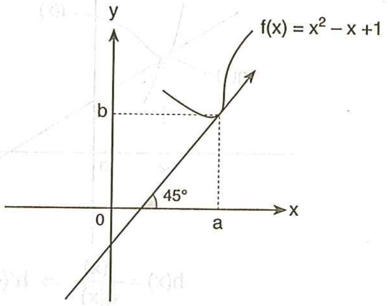
A) 1

B) 2

C) 3

D) 4

E) 5


y
f(x) = x² – x +1
b
45°
0
a
x

5. **$m_N = ?$**

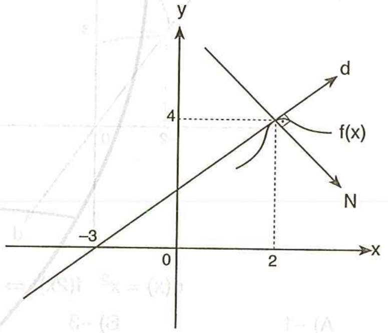
A) $\frac{5}{4}$

B) 1

C) $-\frac{4}{5}$

D) –1

E) $-\frac{5}{4}$


y
d
4
f(x)
N
–3
0
2
x

6. **$m_N = ?$**

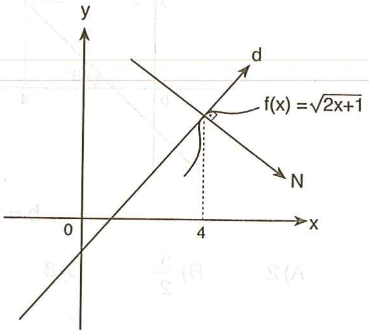
A) –3

B) –1

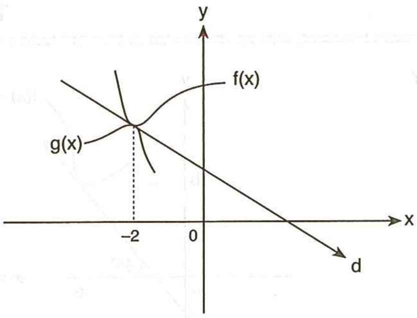
C) $\frac{1}{2}$

D) 1

E) 3


y
d
f(x) = √2x+1
N
0
4
x

7.

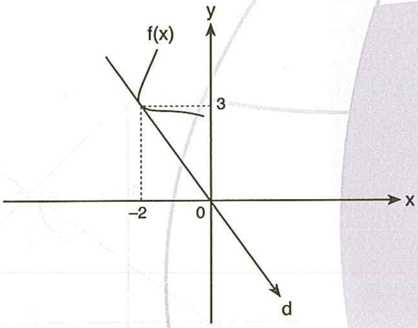


$h(x) = \dfrac{f(x)}{g(x)} \Rightarrow \mathbf{h'(-2) = ?}$

A) –2 B) –1 C) 0

D) 1 E) 2

8.

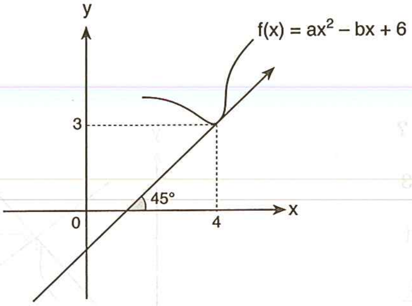


$g(x) = x^2 \cdot f(2x) \Rightarrow \mathbf{g'(-1) = ?}$

A) –1 B) –3 C) –5

D) –7 E) –9

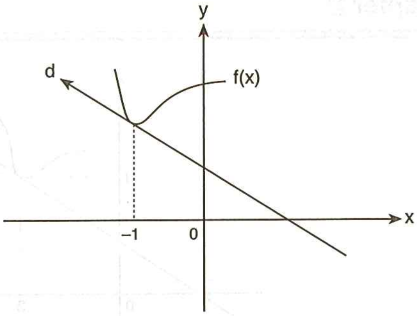
9.


y
f(x) = ax² – bx + 6
3
45°
0
4
x

b = ?

A) 2 B) $\frac{5}{2}$ C) 3 D) $\frac{7}{2}$ E) 4

10.

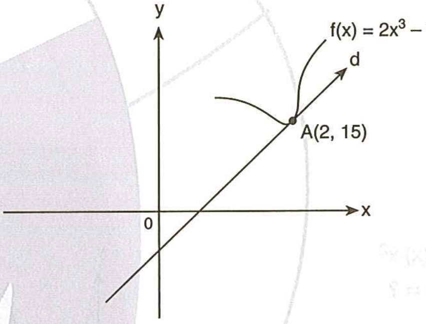


$f(x) = 3x^2 - 4x + 2 \Rightarrow \mathbf{m_d = ?}$

A) –5 B) –7 C) –10

D) –12 E) –13

11.


y
f(x) = 2x³ – 1
d
A(2, 15)
x
0

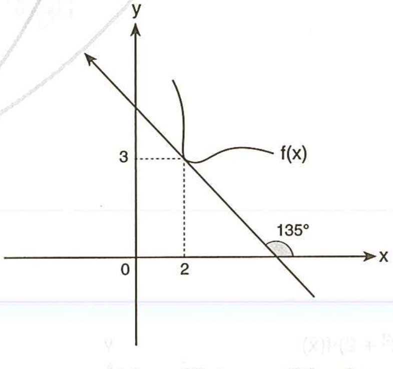
d = ?

A) $y - 24x + 33 = 0$ B) $y - 24x + 32 = 0$

C) $y + 23x + 33 = 0$ D) $y - 23x + 31 = 0$

E) $-y - 23x + 31 = 0$

12.


y
3
f(x)
135°
0
2
x

$g(x) = x \cdot f(2x) \Rightarrow \mathbf{g'(1) = ?}$

A) –2 B) –1 C) 0

D) 1 E) 2

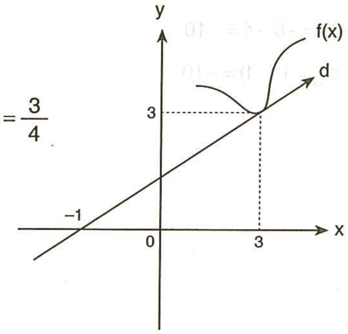
Yanıtlar / Answers

1. C	4. B	7. C	10. C
2. D	5. E	8. E	11. A
3. E	6. A	9. B	12. D

1. $f'(3) = m_d$

$m_d = \tan\alpha$

$m_d = \frac{3}{4} \Rightarrow f'(3) = \frac{3}{4}$



Yanıt / Answer C

2. $h(x) = f(x) \cdot x^2$

$h'(x) = f'(x) \cdot x^2 + 2x \cdot f(x)$

$h'(2) = f'(2) \cdot 2^2 + 2 \cdot 2 \cdot f(2)$

$$\left.\begin{array}{l} f'(2) = m_d = \frac{3}{3} = 1 \\ f(2) = 3 \end{array}\right\} \Rightarrow h'(2) = 1 \cdot 4 + 4 \cdot 3 = 16$$

Yanıt / Answer D

3. $h(x) = (x^2 + 2) \cdot f(x)$

$h'(x) = (2x) \cdot f(x) + f'(x) \cdot (x^2 + 2)$

$h'(4) = (2 \cdot 4) \cdot f(4) + f'(4) \cdot (4^2 + 2)$

$$\left.\begin{array}{l} f'(4) = m_d = \frac{4}{6} = \frac{2}{3} \\ f(4) = 4 \end{array}\right\} \Rightarrow h'(4) = 8 \cdot 4 + \frac{2}{3} \cdot 18 = 44$$

Yanıt / Answer E

4. $f'(a) = m_d = \tan 45°$

$2a - 1 = 1$

$a = 1$

$a = 1 \Rightarrow b = 1^2 - 1 + 1 = 1$

$a + b = 1 + 1 = 2$

Yanıt / Answer B

5. $m_d = \tan\alpha = \frac{4}{5}$

$m_d \cdot m_N = -1$

$\frac{4}{5} \cdot m_N = -1 \Rightarrow m_N = -\frac{5}{4}$

Yanıt / Answer E

6.
$$\left.\begin{array}{l} m_d = f'(4) \\ f'(x) = \frac{2}{2\sqrt{2x+1}} \end{array}\right\} \Rightarrow m_d = \frac{2}{2 \cdot 3} = \frac{1}{3}$$

$m_d \cdot m_N = -1$

$\frac{1}{3} \cdot m_N = -1 \Rightarrow m_N = -3$

Yanıt / Answer A

7. $h(x)=\dfrac{f(x)}{g(x)} \Rightarrow$

$$h'(x)=\frac{f'(x)\cdot g(x)-g'(x)\cdot f(x)}{(g(x))^2}$$

$$\left.\begin{aligned}&f'(2)=g'(2)\\&f(2)=g(2)\end{aligned}\right\} \Rightarrow h'(2)=0$$

Yanıt / Answer C

8. $g(x)=x^2\cdot f(2x)$

$g'(x)=2x\cdot f(2x)+2\cdot f'(2x)\cdot x^2$

$g'(-1)=-2\cdot f(-2)+2\cdot f'(-2)\cdot 1$

$$\left.\begin{aligned}&f(-2)=3\\&f'(-2)=m_d=-\frac{3}{2}\end{aligned}\right\} \Rightarrow g'(-1)=2\cdot 3+2\cdot -\frac{3}{2}=-6-3=-9$$

Yanıt / Answer E

9. $f'(4)=\tan 45°$

$f'(x)=2ax-b \;\Rightarrow\; f'(4)=8a-b=1$

$f(4)=16a-4b+6=3$

$16a-4b=-3$

$$\left.\begin{aligned}&8a-b=1\\&16a-4b=-3\end{aligned}\right\} \Rightarrow b=\frac{5}{2}$$

Yanıt / Answer B

10. $m_d=f'(-1)$

$f'(x)=6x-4$

$f'(-1)=-6-4=-10$

$\Rightarrow m_d=f'(-1)=-10$

Yanıt / Answer C

11. $m_d=f'(2)$

$f'(x)=6x^2$

$f'(2)=6\cdot 2^2=24$

$d:(y-y_0)=m_d\cdot(x-x_0)$

$d:(y-15)=24x-48$

$d:\; y-24x+33=0$

Yanıt / Answer A

12. $g(x)=x\cdot f(2x)$

$g'(x)=1\cdot f(2x)+2\cdot f'(2x)\cdot x$

$g'(1)=f(2)+2\cdot f'(2)\cdot 1$

$$\left.\begin{aligned}&f(2)=3\\&f'(2)=\tan 135°=-1\end{aligned}\right\} \Rightarrow g'(1)=3+2\cdot(-1)=1$$

Yanıt / Answer D

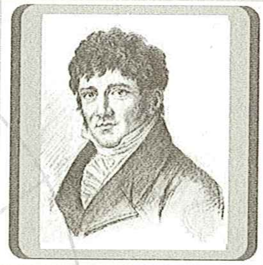
ÜNİTE 10

UNIT

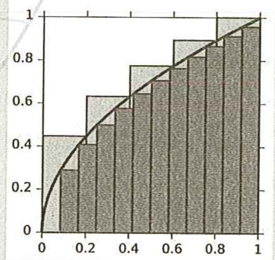
Bessel Friedrich Wilhelm [1784 – 1846]

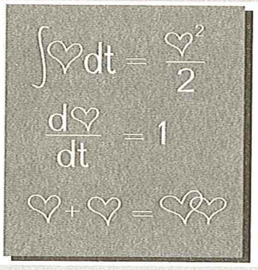
Yunan gökbilimci ve matematikçi. Bessel fonksiyonları, diferansiyel denklemlerin elde edilmesinde, fonksiyonlardan sonra mühendislik ve fizik alanında sık kullanılır.

German astronomer and mathematician who made a major contribution to mathematics in the development of what are now called Bessel functions. These functions, which satisfy certain differential equations, and probably the most commonly occurring functions in physics and engineering after the elementary functions.



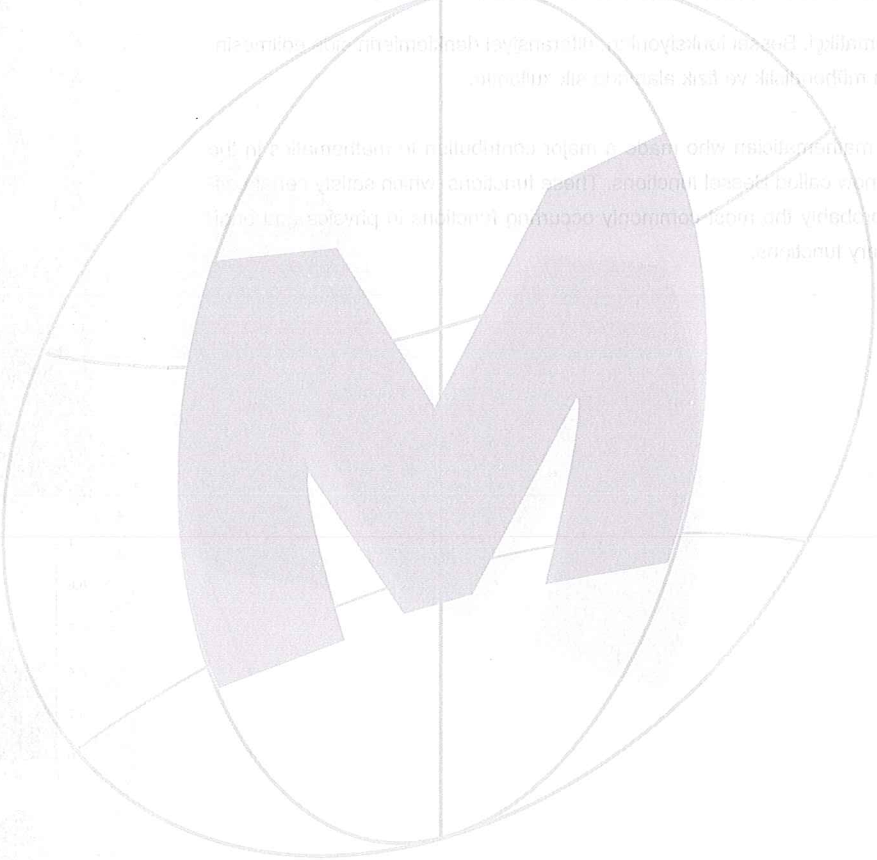
V
f(x) = ax² + bx + c
A





✓ **BELİRSİZ İNTEGRAL** .... **469 – 496**
✓ **BELİRLİ İNTEGRAL** .... **497 – 520**

✓ INDEFINITE INTEGRAL .... 469 – 496
✓ DEFINITE INTEGRAL .... 497 – 520



Belirsiz İntegral / Indefinite Integral

Test 1

1. $\int(x^3-4x^2+4x)dx=?$

A) $\frac{x^4}{4}+\frac{4x^3}{3}-\frac{4x}{3}+C$ B) $\frac{x^4}{4}-\frac{4x^3}{3}+2x^2+C$

C) $\frac{x^4}{4}-\frac{3x^3}{4}+\frac{4x^2}{3}+C$ D) $\frac{x^4}{4}-\frac{8x^3}{3}+\frac{8x^2}{2}+C$

E) $\frac{x^4}{4}+\frac{8x^3}{3}+\frac{8x^2}{3}+C$

2. $\int(5x^4+4x^3+2x+1)dx=?$

A) $x^5+x^4+x^2+x+C$

B) $2x^5-x^4+x^2+x+C$

C) $\frac{x^5}{5}+\frac{x^4}{4}+x^2+\frac{x}{2}+C$

D) $x^5-x^4+\frac{x^2}{2}+C$

E) $\frac{x^5}{4}+\frac{x^4}{3}+\frac{x^2}{2}+x+C$

3. $\int(3x^2+2x+\frac{1}{x^2})\,dx=?$

A) $\frac{x^3}{3}+2x^2+C$ B) $x^3+\frac{x^2}{2}-\frac{1}{x}+C$

C) $x^3+x^2+\frac{1}{x}+C$ D) $x^3-x^2+\frac{1}{x}+C$

E) $x^3+x^2-\frac{1}{x}+C$

4. $\int(2x+\frac{1}{\sqrt{x}}+\frac{1}{x})\,dx=?$

A) $x^2+2\sqrt{x}+\ln|x|+C$ B) $x^2+\sqrt{x}-\ln|x|+C$

C) $x^3+x^2+\frac{1}{x}+C$ D) $x^2+\sqrt{x}\ln|x|+C$

E) $x^2+\sqrt{x}-\frac{1}{x^2}+C$

5. $\int\frac{x^2-2x-3}{x-3}dx=?$

A) x^2+x+C B) $\frac{x^2}{2}+x+C$ C) $\frac{x^2}{2}-x+C$

D) x^2-x+C E) x^2+2x+C

6. $\int\frac{x^3-1}{x^2+x+1}dx=?$

A) $\frac{x^2}{2}-x+C$ B) $2x-x+C$ C) $\frac{x^2}{2}+x+C$

D) $\frac{x^2}{2}+2x+C$ E) $\frac{x^2}{2}-2x+C$

7. $\int\frac{x^3}{\sqrt{x}}dx=?$

A) $\frac{2}{7}x^3\sqrt{x}+C$ B) $\frac{7}{2}x^3\sqrt{x}+C$ C) $\frac{2}{7}\sqrt{x}+C$

D) $\frac{7}{2}\sqrt{x}+C$ E) $7x^3\sqrt{x}+C$

8. $\int\frac{dx}{\sqrt{x\sqrt{x\sqrt[3]{x}}}}=?$

A) $\frac{1}{6}\sqrt[6]{x}+C$ B) $\frac{1}{3}x\sqrt{x}+C$ C) $6\cdot\sqrt[6]{x}+C$

D) $3\cdot\sqrt[6]{x}+C$ E) $6\cdot\sqrt[3]{x}+C$

9. $\int\left(\dfrac{6x^3-2x^2-x-3}{x^2}\right)dx=?$

A) $3x^2-2x-\ln|x|+\dfrac{3}{x}+C$

B) $3x^2-2x+\ln|x|-\dfrac{3}{x}+C$

C) $3x^2-2x-\ln|x|-\dfrac{3}{x}+C$

D) $3x^2-2+\ln|x|-3x+C$

E) $3x^2-2x-\ln|x|+3x+C$

10. $\int(e^x+5^x)dx=?$

A) $e^x+5^x\cdot\ln5+C$
B) $e^x+5^x\ln5x+C$

C) $e^x+5\cdot\ln5^x+C$
D) $e^x+\dfrac{5^x}{\ln5}+C$

E) $e^x+\dfrac{5}{\ln5^x}+C$

11. $\int\dfrac{3e^{2x}-5e^x+2}{e^x-1}dx=?$

A) $3e^x+2x+C$
B) $3e^x+x+C$
C) $3e^x-2x+C$

D) $3e^x-x+C$
E) $3e^x+C$

12. $\int\left(\dfrac{3}{\sqrt{1-x^2}}+\cos x\right)dx=?$

A) $3\cdot\arctan x+\sin x+C$
B) $3\cdot\text{arccot}\,x+\sin x+C$

C) $3\cdot\arcsin x+\sin x+C$
D) $3\cdot\arcsin x-\sin x+C$

E) $3\cdot\arccos x-\sin x+C$

13. $\int\left(\dfrac{5}{\cos^2x}+\dfrac{2}{\sin^2x}-4^x\right)dx=?$

A) $5\tan x+2\cot x-\dfrac{4^x}{\ln4}+C$

B) $5\tan x-2\cot x-4^x\ln4+C$

C) $5\tan x-2\cot x-\dfrac{4^x}{\ln4}+C$

D) $-5\cot x+2\tan x-\dfrac{4^x}{\ln4}+C$

E) $-5\cot x-2\tan x-4^x\ln4+C$

14. $\left.\begin{array}{l}f(1)=8,\\ f'(x)=4x^3-3x^2+2x\end{array}\right\}\Rightarrow$ **$f(-1)=?$**

A) 8
B) 10
C) 12
D) 14
E) 16

15. $\int\tan^2x\,dx=?$

A) $\tan x+C$
B) $\tan^2x+C$
C) $\tan^2x-x+C$

D) $\tan x-x+C$
E) $\tan x+x+C$

16. $\int\dfrac{\cos(e^{-x})}{e^x}dx=?$

A) $\sin(e^{-x})+C$

B) $\cos(e^{-x})+C$

C) $-\cos(e^{-x})+C$

D) $e^{-x}\cos(e^{-x})+C$

E) $-\sin(e^{-x})+C$

[AKDENİZ ÜNV. YÖS 2013]

Yanıtlar / Answers

1. B	4. A	7. A	10. D	13. C	16. E
2. A	5. B	8. C	11. C	14. B	
3. E	6. A	9. A	12. C	15. E	

1. $$\int (x^3-4x^2+4x)\,dx=\frac{x^{3+1}}{3+1}-4\cdot\frac{x^{2+1}}{2+1}+4\cdot\frac{x^{1+1}}{1+1}+C$$

$$=\frac{x^4}{4}-\frac{4x^3}{3}+2x^2+C$$

Yanıt / Answer B

2. $$\int (5x^4+4x^3+2x+1)\,dx$$

$$=5\cdot\frac{x^{4+1}}{4+1}+4\cdot\frac{x^{3+1}}{3+1}+2\frac{x^{1+1}}{1+1}+x+C$$

$$=5\cdot\frac{x^5}{5}+4\cdot\frac{x^4}{4}+2\frac{x^2}{2}+x+C$$

$$=x^5+x^4+x^2+x+C$$

Yanıt / Answer A

3. $$\int\left(3x^2+2x+\frac{1}{x^2}\right)dx$$

$$=\int\left(3x^2+2x+x^{-2}\right)dx$$

$$=3\cdot\frac{x^{2+1}}{2+1}+2\cdot\frac{x^{1+1}}{1+1}+\frac{x^{-2+1}}{-2+1}+C$$

$$=3\cdot\frac{x^3}{3}+2\cdot\frac{x^2}{2}+\frac{x^{-1}}{-1}+C$$

$$=x^3+x^2-\frac{1}{x}+C$$

Yanıt / Answer E

4. $$\int\left(2x+\frac{1}{\sqrt{x}}+\frac{1}{x}\right)dx$$

$$=\int 2x\,dx+\int x^{-\frac{1}{2}}\,dx+\int\frac{1}{x}\,dx$$

$$=2\cdot\frac{x^2}{2}+\frac{x^{-\frac{1}{2}+1}}{-\frac{1}{2}+1}+\ln|x|+C$$

$$=x^2+2\sqrt{x}+\ln|x|+C$$

Yanıt / Answer A

5. $$\int\frac{x^2-2x-3}{x-3}\,dx=\int\frac{(x-3)(x+1)}{x-3}\,dx$$

$$=\int(x+1)\,dx=\frac{x^2}{2}+x+C$$

Yanıt / Answer B

6. $$\int\frac{x^3-1}{x^2+x+1}\,dx=\int\frac{(x-1)(x^2+x+1)}{x^2+x+1}\,dx$$

$$=\int(x-1)\,dx=\frac{x^{1+1}}{1+1}-x+C$$

$$=\frac{x^2}{2}-x+C$$

Yanıt / Answer A

7. $$\int\frac{x^3}{\sqrt{x}}\,dx=\int\frac{x^3}{x^{\frac{1}{2}}}\,dx=\int x^3x^{-\frac{1}{2}}\,dx=\int x^{3-\frac{1}{2}}\,dx$$

$$=\int x^{\frac{5}{2}}\,dx=\frac{x^{\frac{5}{2}+1}}{\frac{5}{2}+1}+C=\frac{2}{7}x^{\frac{7}{2}}+C$$

$$=\frac{2}{7}x^3\sqrt{x}+C$$

Yanıt / Answer A

8. $$\int\frac{dx}{\sqrt[2]{x\sqrt[2]{x\sqrt[3]{x}}}}=\int\frac{dx}{\sqrt[12]{x\cdot x^6\cdot x^3}}=\int\frac{dx}{\sqrt[12]{x^{10}}}=\int\frac{dx}{x^{\frac{10}{12}}}$$

$$=\int x^{-\frac{5}{6}}\,dx=\frac{x^{-\frac{5}{6}+1}}{-\frac{5}{6}+1}+C$$

$$=\frac{x^{\frac{1}{6}}}{\frac{1}{6}}+C=6\sqrt[6]{x}+C$$

Yanıt / Answer C

9. $$\int\left(\frac{6x^3-2x^2-x-3}{x^2}\right)dx=\int\left(\frac{6x^3}{x^2}-\frac{2x^2}{x^2}-\frac{x}{x^2}-\frac{3}{x^2}\right)dx$$

$$=\int\left(6x-2-\frac{1}{x}-3x^{-2}\right)dx$$

$$=6\cdot\frac{x^{1+1}}{1+1}-2x-\ln|x|-3\cdot\frac{x^{-2+1}}{-2+1}+C$$

$$=6\cdot\frac{x^2}{2}-2x-\ln|x|-3\cdot\frac{x^{-1}}{-1}+C$$

$$=3x^2-2x-\ln|x|+\frac{3}{x}+C$$

Yanıt / Answer A

10. $$\int(e^x+5^x)\,dx=\int e^x\,dx+\int 5^x\,dx$$

$$=e^x+\frac{1}{\ln 5}\cdot 5^x+C$$

Yanıt / Answer D

11. $$\int\frac{3e^{2x}-5e^x+2}{e^x-1}\,dx=\int\frac{(e^x-1)(3e^x-2)}{e^x-1}\,dx$$

$$=\int(3e^x-2)\,dx$$

$$=3e^x-2x+C$$

Yanıt / Answer C

12. $$\int\left(\frac{3}{\sqrt{1-x^2}}+\cos x\right)dx=3\int\frac{1}{\sqrt{1-x^2}}\,dx+\int\cos x\,dx$$

$$=3\arcsin x+\sin x+C$$

Yanıt / Answer C

13. $$\int\left(\frac{5}{\cos^2 x}+\frac{2}{\sin^2 x}-4^x\right)dx$$

$$=\int\frac{5}{\cos^2 x}\,dx+\int\frac{2}{\sin^2 x}\,dx-\int 4^x\,dx$$

$$=5\int\frac{dx}{\cos^2 x}+2\int\frac{dx}{\sin^2 x}-\int 4^x\,dx$$

$$=5\tan x-2\cot x-\frac{4^x}{\ln 4}+C$$

Yanıt / Answer C

14. $$f(x)=\int(4x^3-3x^2+2x)\,dx\ \Rightarrow$$

$$f(x)=4\cdot\frac{x^4}{4}-\frac{3x^3}{3}+2\cdot\frac{x^2}{2}+C$$

$$f(x)=x^4-x^3+x^2+C$$

$$f(1)=1-1+1+C$$

$$8=1+C\ \Rightarrow\ C=7$$

$$f(x)=x^4-x^3+x^2+7$$

$$f(-1)=(-1)^4-(-1)^3+(-1)^2+7$$

$$=1+1+1+7=10$$

Yanıt / Answer B

15. $$\int\tan^2 x\,dx=\int(1+1+\tan^2 x)\,dx$$

$$=\int 1\,dx+\int(1+\tan^2 x)\,dx$$

$$=x+\tan x+C$$

Yanıt / Answer E

16. $$e^{-x}=u$$

$$-e^{-x}\,dx=du$$

$$\frac{dx}{e^x}=-du$$

$$\int\frac{\cos(e^{-x})}{e^x}\,dx=\int\cos u\cdot(-du)=-\sin u+C$$

$$=-\sin e^{-x}+C$$

Yanıt / Answer E

1. $\int \frac{x^3+x^2+x+1}{x}dx=?$

A) $\frac{x^3}{3}+\frac{x^2}{2}+x+\ln|x|+C$

B) $\frac{x^3}{3}+\frac{x^2}{2}+x+C$

C) $\frac{x^3}{3}+\frac{x^2}{2}+\ln|x|+C$

D) $\frac{x^3}{3}+\frac{x^2}{2}+x+2\ln|x|+C$

E) $\frac{x^3}{3}+\frac{x^2}{2}+2x+\ln|x|+C$

2. $\int 3(x-1)(x+1)dx=?$

A) x^2-3x+C

B) x^3+3x+C

C) $x^3+\frac{x}{3}+C$

D) x^3-3x+C

E) $x^3-\frac{x}{3}+C$

3. $\int \frac{5x^4+x+3x^2}{x^2}dx=?$

A) $\frac{5}{3}x^3+x+\frac{3}{\ln 3}+C$

B) $\frac{5}{3}x^3+\ln|x|+3x+C$

C) $\frac{5}{3}x^3+\ln|x|+x+C$

D) $\frac{2}{3}x^3+2\ln|x|+3x+C$

E) $3x^2+\ln|x|+3x+C$

4. $\int\left(3^x+e^x+\tan^2x+2\right)dx=?$

A) $\frac{3^x}{\ln 3}+e^x+\tan x+2x+C$

B) $\frac{3^x}{\ln 3}+e^x+\tan x+x+C$

C) $\frac{3^x}{\ln 3}+e^x+\tan^2 x+C$

D) $3^x+e^x+\tan^2x+2x$

E) $3^x+e^x+\tan x+C$

5. $\int\left(1+\tan^2x+\frac{1}{1+x^2}\right)dx=?$

A) tanx + arctan x + C

B) tanx + arccot x + C

C) cot x + arctan x + C

D) arccot x + arctan x + C

E) tanx − arctan x + C

6. $\int x^2\cdot f(x)\cdot dx=x^4+3x^3+C \quad\Rightarrow\quad f(-2)=?$

A) −2 B) −1 C) 0 D) 1 E) 2

7. $\left.\begin{array}{l} f'(x)=3x^2-2x \\ f(1)=-4 \end{array}\right\} \Rightarrow f(2)=?$

A) −2 B) −1 C) 0 D) 1 E) 2

8. $\int \sin x\cdot f(x)\cdot dx=\cos 2x+C \quad\Rightarrow\quad f\left(\frac{\pi}{6}\right)=?$

A) $-2\sqrt{3}$ B) $-\sqrt{3}$ C) $-\frac{\sqrt{3}}{2}$

D) $-\frac{1}{2}$ E) $\frac{1}{2}$

9. $\int f(x)dx = \frac{1}{3}x^3 + \frac{1}{2}x^2 + 4x + C \Rightarrow$ **f(2) = ?**

A) 12 B) 10 C) 8 D) 6 E) 4

10. $\int f(x)\,dx = 2\tan x - 2x + C \Rightarrow$ **$f(\frac{\pi}{4}) = ?$**

A) 2 B) 3 C) 4 D) 6 E) 8

11. $\int f(x)dx = \arctan(2x-1) + \frac{3x}{5} + C \Rightarrow$ **f(2) = ?**

A) 2 B) $\frac{3}{2}$ C) 1 D) $\frac{3}{5}$ E) $\frac{4}{5}$

12. $\left.\begin{array}{l} f'(x) = 3x^2 - 4x + 2 \\ f(2) = 5 \end{array}\right\} \Rightarrow$ **f(1) = ?**

A) –2 B) –1 C) 0 D) 1 E) 2

13. $\frac{d \cdot f(x)}{dx} = 12x^3 - 3x^2 + 4x$

$f(2) = 37 \Rightarrow$ **f(1) = ?**

A) –7 B) 7 C) 11 D) 14 E) 15

14. $f(x) = \tan x + \cos x \Rightarrow$ **$\int d\,f(x) = ?$**

A) –cotx – sinx + C
B) cotx – sinx + C
C) tanx + cosx + C
D) tanx – cosx + C
E) tanx – sinx + C

15. $\int \frac{\mathbf{d(sinx)}}{\mathbf{cosx}} = ?$

A) $x^2 + C$
B) x + C
C) $\sqrt{x} + C$
D) cosx + C
E) sinx + C

16. $\int \frac{dx}{9 + 4x^2} = ?$

A) $\frac{2}{3}\ln x^2 + C$

B) $\sin\frac{2x}{3} + C$

C) $\frac{1}{6}\arctan\frac{2x}{3} + C$

D) $\frac{1}{3}\arcsin\frac{2x}{3} + C$

E) $\frac{1}{3}\arccos\frac{3x}{5} + C$

[YTÜ. YÖS 2013]

Yanıtlar / Answers

1. A	4. B	7. C	10. A	13. A	16. C
2. D	5. A	8. A	11. E	14. C	
3. B	6. D	9. B	12. E	15. B	

1. $$\int \frac{x^3+x^2+x+1}{x}\,dx=\int\left(\frac{x^3}{x}+\frac{x^2}{x}+\frac{x}{x}+\frac{1}{x}\right)dx$$

$$=\int\left(x^2+x+1+\frac{1}{x}\right)dx=\frac{x^{2+1}}{2+1}+\frac{x^{1+1}}{1+1}+x+\ln|x|+C$$

$$=\frac{x^3}{3}+\frac{x^2}{2}+x+\ln|x|+C$$

Yanıt / Answer A

2. $$\int 3(x-1)(x+1)\,dx=3\int(x^2-1)\,dx$$

$$=3\left(\frac{x^{2+1}}{2+1}-x\right)+C$$

$$=3\left(\frac{x^3}{3}-x\right)+C$$

$$=x^3-3x+C$$

Yanıt / Answer D

3. $$\int\frac{5x^4+x+3x^2}{x^2}\,dx=\int\frac{5x^4}{x^2}+\frac{x}{x^2}+\frac{3x^2}{x^2}\,dx$$

$$=\int 5x^2+\frac{1}{x}+3\,dx$$

$$=\int 5x^2\,dx+\int\frac{1}{x}\,dx+\int 3\,dx$$

$$=\frac{5x^{2+1}}{2+1}+\ln|x|+3x+C$$

$$=\frac{5x^3}{3}+\ln|x|+3x+C$$

Yanıt / Answer B

4. $$\int(3^x+e^x+\tan^2x+2)\,dx$$

$$=\int 3^x\,dx+\int e^x\,dx+\int(\tan^2x+1)\,dx+\int 1\,dx$$

$$=\frac{1}{\ln 3}\cdot 3^x+e^x+\tan x+x+C$$

Yanıt / Answer B

5. $$\int\left(1+\tan^2x+\frac{1}{1+x^2}\right)dx$$

$$=\int(1+\tan^2x)\,dx+\int\frac{1}{1+x^2}\,dx$$

$$=\tan x+\arctan x+C$$

Yanıt / Answer A

6. $$\int x^2\cdot f(x)\,dx=x^4+3x^3+C$$

$$\Rightarrow x^2\cdot f(x)=(x^4+3x^3+C)'$$

$$x^2\cdot f(x)=4x^3+9x^2$$

$$f(x)=\frac{4x^3}{x^2}+\frac{9x^2}{x^2}$$

$$f(x)=4x+9$$

$$f(-2)=4(-2)+9=-8+9=1$$

Yanıt / Answer D

7. $$f'(x)=3x^2-2x\Rightarrow\int f'(x)dx=\int 3x^2-2x\,dx$$

$$f(x)=\int(3x^2-2x)dx=3\frac{x^{2+1}}{2+1}-2\frac{x^{1+1}}{1+1}+C$$

$$=3\frac{x^3}{3}-2\frac{x^2}{2}+C$$

$$f(x)=x^3-x^2+C$$

$$f(1)=1-1+C\Rightarrow C=-4$$

$$f(x)=x^3-x^2-4$$

$$f(2)=(2)^3-(2)^2-4=8-4-4=0$$

Yanıt / Answer C

8. $$\int\sin x\cdot f(x)\,dx=\cos 2x+C$$

$$\Rightarrow\sin x\cdot f(x)=(\cos 2x+C)'$$

$$\sin x\cdot f(x)=-2\sin 2x$$

$$f(x)=-\frac{4\sin x\cdot\cos x}{\sin x}=-4\cos x$$

$$f\left(\frac{\pi}{6}\right)=-4\cos\frac{\pi}{6}=-4\cdot\frac{\sqrt{3}}{2}=-2\sqrt{3}$$

Yanıt / Answer A

9. $\int f(x)\,dx = \frac{1}{3}\cdot x^3 + \frac{1}{2}\cdot x^2 + 4x + C$

$$\Rightarrow f(x) = \left(\frac{1}{3}\cdot x^3 + \frac{1}{2}\cdot x^2 + 4x + C\right)'$$

$$f(x) = x^2 + x + 4$$

$$f(2) = 2^2 + 2 + 4 = 4 + 2 + 4 = 10$$

Yanıt / Answer B

10. $\int f(x)\,dx = 2\tan x - 2x + C$

$$\Rightarrow f(x) = (2\tan x - 2x + C)'$$

$$f(x) = 2(1 + \tan^2 x) - 2$$

$$f\left(\frac{\pi}{4}\right) = 2\left(1 + \tan^2\frac{\pi}{4}\right) - 2$$

$$= 2(1+1) - 2 = 4 - 2 = 2$$

Yanıt / Answer A

11. $\int f(x)\,dx = \arctan(2x-1) + \frac{3x}{5} + C$

$$\Rightarrow f(x) = \left(\arctan(2x-1) + \frac{3x}{5} + C\right)'$$

$$f(x) = \frac{2}{1+(2x-1)^2} + \frac{3}{5}$$

$$f(2) = \frac{2}{1+(4-1)^2} + \frac{3}{5}$$

$$= \frac{2}{1+9} + \frac{3}{5} = \frac{1}{5} + \frac{3}{5} = \frac{4}{5}$$

Yanıt / Answer E

12. $f(x) = \int (3x^2 - 4x + 2)\,dx$

$$\Rightarrow f(x) = 3\cdot\frac{x^{2+1}}{2+1} - 4\cdot\frac{x^{1+1}}{1+1} + 2x + C$$

$$= 3\cdot\frac{x^3}{3} - 4\cdot\frac{x^2}{2} + 2x + C$$

$$= x^3 - 2x^2 + 2x + C$$

$$f(2) = 8 - 2\cdot 4 + 2\cdot 2 + C$$

$$5 = 8 - 8 + 4 + C \Rightarrow C = 1$$

$$f(x) = x^3 - 2x^2 + 2x + 1$$

$$f(1) = 1 - 2 + 2 + 1 = 2$$

Yanıt / Answer E

13. $f(x) = \int (12x^3 - 3x^2 + 4x)\,dx \Rightarrow$

$$f(x) = 12\cdot\frac{x^{3+1}}{3+1} - 3\cdot\frac{x^{2+1}}{2+1} + 4\cdot\frac{x^{1+1}}{1+1} + C$$

$$f(x) = 12\cdot\frac{x^4}{4} - 3\cdot\frac{x^3}{3} + 4\cdot\frac{x^2}{2} + C$$

$$f(x) = 3x^4 - x^3 + 2x^2 + C$$

$$f(2) = 3\cdot 2^4 - 2^3 + 2\cdot 2^2 + C$$

$$37 = 48 - 8 + 8 + C$$

$$37 = 48 + C \Rightarrow C = -11$$

$$f(x) = 3x^4 - x^3 + 2x^2 - 11$$

$$f(1) = 3 - 1 + 2 - 11 = -7$$

Yanıt / Answer A

14. $f(x) = \tan x + \cos x$

$$\int df(x) = f(x) + C$$

$$= \tan x + \cos x + C$$

Yanıt / Answer C

15. $d(\sin x) = \cos x\,dx \Rightarrow$

$$\int \frac{d(\sin x)}{\cos x} = \int \frac{\cos x\,dx}{\cos x} = \int 1\,dx = x + C$$

Yanıt / Answer B

16. $\int \frac{dx}{9+4x^2} = \frac{1}{9}\int \frac{dx}{1+\left(\frac{2x}{3}\right)^2}$

$$\frac{2x}{3} = u \Rightarrow \frac{2dx}{3} = du$$

$$dx = \frac{3du}{2}$$

$$\Rightarrow \frac{1}{9}\int \frac{3du}{2(1+u^2)} = \frac{1}{6}\arctan u$$

$$= \frac{1}{6}\arctan\frac{2x}{3} + C$$

Yanıt / Answer C

1. $\int \frac{2x+3}{\sqrt{x^2+3x}}\,dx = ?$

A) $\sqrt{x^2+3x}+C$

B) $\ln|x^2+3x|+C$

C) $\ln\sqrt{x^2+3x}+C$

D) $2\sqrt{x^2+3x}+C$

E) $\frac{1}{2}\cdot\ln\sqrt{x^2+3x}+C$

2. $\int \frac{\sqrt{\ln x}}{x}\,dx = ?$

A) $\frac{2}{3}\sqrt{\ln x}+C$

B) $\frac{1}{2}(\ln x)^2+C$

C) $\frac{1}{3}\ln x+C$

D) $\frac{1}{4}\sqrt{\ln x}+C$

E) $\frac{2}{3}(\ln x)^{\frac{3}{2}}+C$

3. $\int \frac{\ln^2 x}{x}\,dx = ?$

A) $\frac{(\ln x)^3}{2}+C$

B) $\frac{(\ln x)^3}{3}+C$

C) $\frac{\ln x}{x}+C$

D) $x\cdot\ln x+C$

E) $\ln x+x+C$

4. $\int \frac{\tan x}{\cos^2 x}\,dx = ?$

A) $\frac{\tan^2 x}{2}+C$

B) $2\tan^2 x+C$

C) $\cos^2 x+C$

D) $-3\tan x\cdot\sin x+C$

E) $\frac{\tan^3 x}{3}+C$

5. $-\int \cot x\cdot\operatorname{cosec}^2 x\,dx = ?$

A) $\cot^3 x+C$

B) $\frac{\cot^2 x}{2}+C$

C) $\cot^2 x+C$

D) $2\cot x+C$

E) $\sec^2 x+C$

6. $\int \sin^3 x\cos x\,dx = ?$

A) $\frac{\cos^4 x}{4}+C$

B) $\frac{\sin^2 x}{2}+C$

C) $\frac{\sin^3 x}{3}+C$

D) $\frac{\sin^4 x}{4}+C$

E) $\sin^2 x\cdot\cos x+C$

7. $\int e^{\sin x}\cos x\,dx = ?$

A) $e^{\cos x}+C$

B) $e^{\sin x}+C$

C) $e^{2\sin x}+C$

D) $e^{-2\sin x}+C$

E) $e^{-2\cos x}+C$

8. $\int (3x^2-1)^4\,6x\,dx = ?$

A) $6\cdot(3x^2-1)^5+C$

B) $\frac{(3x^2-1)^4}{4}+C$

C) $-5(3x^2-1)^5+C$

D) $\frac{(3x^2-1)^5}{5}+C$

E) $4(3x^2-1)^4+C$

9. $\int \frac{1}{2x+7}\,dx = ?$

A) $\frac{1}{2}\ln|2x+7|+C$ B) $2\ln|2x+7|+C$

C) $\ln(2x+7)+C$ D) $\frac{1}{(2x+7)^2}+C$

E) $4x^2+7x+C$

10. $\int \tan x\cdot\ln(\cos x)\,dx = ?$

A) $\ln\left|\frac{\sin x}{2}\right|+C$

B) $\ln\left|\frac{\tan x}{2}\right|+C$

C) $-\ln^2\left|\frac{\cos x}{2}\right|+C$

D) $-\ln^2\left|\frac{\sin x}{2}\right|+C$

E) $-\ln^2\left|\frac{\tan x}{2}\right|+C$

11. $\int f(x)\cdot f'(x)\,dx = ?$

A) $\frac{f^2(x)}{2}+C$ B) $2\cdot f^2(x)+C$ C) $-3f^2(x)+C$

D) $\frac{f^3(x)}{3}+C$ E) $f(x)+C$

12. $\int \frac{2x+3}{x^2+3x+1}\cdot dx = ?$

A) $\frac{1}{2}\cdot\ln(x^2+3x+1)+C$ B) $\ln|x^2+3x+1|+C$

C) $2\ln|x^2+3x+1|+C$ D) $-2\ln|x^2+3x+1|+C$

E) $-\frac{1}{3}\cdot\ln|x^2+3x+1|+C$

13. $\int \sin(3x+2)\,dx = ?$

A) $-\frac{1}{3}\cos(3x+2)+C$ B) $-\frac{1}{3}\sin(3x+2)+C$

C) $\frac{1}{3}\cos(3x+2)+C$ D) $\frac{1}{3}\sin(3x+2)+C$

E) $-\frac{1}{3}\sin(3x-2)+C$

14. $\int (3x-2)^4\,dx = ?$

A) $\frac{(3x-2)^5}{15}+C$ B) $\frac{(3x-2)^5}{5}+C$

C) $\frac{(3x-2)^5}{10}+C$ D) $\frac{(3x-2)^5}{25}+C$

E) $\frac{(3x-2)^5}{3}+C$

15. $\int \frac{dx}{x-3} = ?$

A) $\ln|x+3|+C$ B) $2\ln|x+3|+C$

C) $3\ln|x+3|+C$ D) $\ln|x-3|+C$

E) $3\ln|x-3|+C$

16. $\int \left(3x^2-2x+\frac{1}{x}\right)dx = ?$

A) $x^3+x^2-\frac{1}{x^2}+C$ B) $x^3-x^2-\frac{1}{x^2}+C$

C) $x^3-x^2-\frac{1}{x^2}+C$ D) $x^3-x^2+\ln x+C$

E) $x^3-x^2-\ln x+C$

[MARMARA ÜNV. YÖS 2013]

Yanıtlar / Answers

1. D	4. A	7. B	10. C	13. A	16. D
2. E	5. B	8. D	11. A	14. A	
3. B	6. D	9. A	12. B	15. D	

1. $t = x^2 + 3x \Rightarrow dt = (2x+3)\,dx$

$$\int \frac{2x+3}{\sqrt{x^2+3x}}\,dx = \int \frac{dt}{\sqrt{t}} = \int t^{-\frac{1}{2}}\,dt$$

$$= \frac{t^{-\frac{1}{2}+1}}{-\frac{1}{2}+1} + C = \frac{t^{\frac{1}{2}}}{\frac{1}{2}} + C$$

$$= 2\sqrt{t} + C$$

$$= 2\sqrt{x^2+3x} + C$$

Yanıt / Answer D

2. $t = \ln x \Rightarrow dt = \frac{1}{x}\,dx$

$$\int \frac{\sqrt{\ln x}}{x}\,dx = \int \sqrt{t}\,dt$$

$$= \int t^{\frac{1}{2}}\,dt = \frac{t^{\frac{1}{2}+1}}{\frac{1}{2}+1} + C$$

$$= \frac{2}{3} \cdot t\sqrt{t} + C = \frac{2}{3} \cdot (\ln x)^{\frac{3}{2}} + C$$

Yanıt / Answer E

3. $t = \ln x \Rightarrow dt = \frac{1}{x}\,dx$

$$\int \frac{\ln^2 x}{x}\,dx = \int \ln^2 x \cdot \frac{1}{x}\,dx$$

$$= \int t^2\,dt = \frac{t^{2+1}}{2+1} + C$$

$$= \frac{t^3}{3} + C = \frac{(\ln x)^3}{3} + C$$

Yanıt / Answer B

4. $t = \tan x \Rightarrow dt = \frac{1}{\cos^2 x}\,dx$

$$\int \frac{\tan x}{\cos^2 x}\,dx = \int \tan x \cdot \frac{1}{\cos^2 x}\,dx$$

$$= \int t\,dt$$

$$= \frac{t^{1+1}}{1+1} + C = \frac{t^2}{2} + C$$

$$= \frac{\tan^2 x}{2} + C$$

Yanıt / Answer A

5. $t = \cot x \Rightarrow dt = -\frac{1}{\sin^2 x}\,dx$

$$-\int \cot x \cdot \operatorname{cosec}^2 x\,dx = -\int \cot x \cdot \left(-\frac{1}{\sin^2 x}\right) dx$$

$$= \int t\,dt = \frac{t^{1+1}}{1+1} + C$$

$$= \frac{t^2}{2} + C$$

$$= \frac{\cot^2 x}{2} + C$$

Yanıt / Answer B

6. $t = \sin x \Rightarrow dt = \cos x\,dx$

$$\int \sin^3 x \cdot \cos x\,dx = \int t^3\,dt$$

$$= \frac{t^{3+1}}{3+1} + C = \frac{t^4}{4} + C$$

$$= \frac{\sin^4 x}{4} + C$$

Yanıt / Answer D

7. $t = \sin x \Rightarrow dt = \cos x\,dx$

$$\int e^{\sin x} \cdot \cos x\,dx = \int e^t\,dt$$

$$= e^t + C$$

$$= e^{\sin x} + C$$

Yanıt / Answer B

8. $t = 3x^2 - 1 \Rightarrow dt = 6x\,dx$

$$\int (3x^2-1)^4 \cdot 6x\,dx = \int t^4\,dt$$

$$= \frac{t^5}{5} + C$$

$$= \frac{(3x^2-1)^5}{5} + C$$

Yanıt / Answer D

9. $t = 2x+7 \Rightarrow dt = 2\,dx \Rightarrow \frac{1}{2}dt = dx$

$$\int \frac{1}{2x+7}\,dx = \frac{1}{2}\int \frac{dt}{t}$$

$$= \frac{1}{2}\cdot \ln|t| + C$$

$$= \frac{1}{2}\cdot \ln|2x+7| + C$$

Yanıt / Answer A

10. $t = \ln(\cos x) \Rightarrow dt = \frac{-\sin x}{\cos x}\,dx \Rightarrow -dt = \tan x\,dx$

$$\int \tan x \cdot \ln(\cos x)\,dx = -\int t\,dt$$

$$= -\frac{t^{1+1}}{1+1} + C$$

$$= -\frac{t^2}{2} + C$$

$$= \frac{-\ln^2|\cos x|}{2} + C$$

Yanıt / Answer C

11. $t = f(x) \Rightarrow dt = f'(x)\,dx$

$$\int f(x)\cdot f'(x)\,dx = \int t\,dt$$

$$= \frac{t^{1+1}}{1+1} + C = \frac{t^2}{2} + C$$

$$= \frac{f^2(x)}{2} + C$$

Yanıt / Answer A

12. $t = x^2+3x+1 \Rightarrow dt = (2x+3)\,dx$

$$\int \frac{2x+3}{x^2+3x+1}\,dx = \int \frac{dt}{t}$$

$$= \ln|t| + C$$

$$= \ln|x^2+3x+1| + C$$

Yanıt / Answer B

13. $t = 3x+2 \Rightarrow dt = 3\,dx \Rightarrow \frac{1}{3}dx = dt$

$$\int \sin(3x+2)\,dx = \int \frac{1}{3}\sin t\,dt$$

$$= -\frac{1}{3}\cos t + C$$

$$= -\frac{1}{3}\cos(3x+2) + C$$

Yanıt / Answer A

14. $t = 3x-2 \Rightarrow dt = 3\,dx \Rightarrow \frac{1}{3}dt = dx$

$$\int (3x-2)^4\,dx = \int t^4\cdot\frac{1}{3}\,dt$$

$$= \frac{1}{3}\int t^4\,dt$$

$$= \frac{1}{3}\cdot\frac{t^{4+1}}{4+1} + C$$

$$= \frac{1}{3}\cdot\frac{t^5}{5} + C = \frac{1}{15}(3x-2)^5 + C$$

Yanıt / Answer A

15. $t = x-3 \Rightarrow dt = dx$

$$\int \frac{dx}{x-3} = \int \frac{dt}{t}$$

$$= \ln|t| + C$$

$$= \ln|x-3| + C$$

Yanıt / Answer D

16. $\int (3x^2 - 2x + \frac{1}{x})\,dx = \frac{3x^3}{3} - \frac{2x^2}{2} + \ln x + C$

$$= x^3 - x^2 + \ln x + C$$

Yanıt / Answer D

1. $\int x\cdot(e)^{x^2}\,dx = ?$

A) $\frac{1}{2}e^{x}+C$ B) $\frac{1}{4}e^{x}+C$ C) $\frac{1}{2}e^{2x}+C$

D) $\frac{1}{2}\cdot(e)^{x^2}+C$ E) $\frac{1}{4}\cdot(e)^{x^2}+C$

2. $\int \frac{2x-3}{x^2-3x}\,dx = ?$

A) $\ln|x^2-3|+C$ B) $\ln|x^2-3x|+C$

C) $\ln|2x-3|+C$ D) $\ln|2x+3|+C$

E) $\ln|2x|+C$

3. $\int (x+1)(x^2+2x-1)^3\,dx = ?$

A) $\frac{(x^2+2x-1)^4}{2}+C$ B) $\frac{(x^2+2x-1)^4}{4}+C$

C) $\frac{(x^2+2x-1)^3}{4}+C$ D) $\frac{(x^2+2x-1)^3}{8}+C$

E) $\frac{(x^2+2x-1)^4}{8}+C$

4. $\int \frac{2x\,dx}{x^2-4} = ?$

A) $\ln|x-2|+C$ B) $\ln|x+2|+C$

C) $\ln|x^2-4|+C$ D) $\ln\left|\frac{x-2}{x+2}\right|+C$

E) $\ln\left|\frac{x+2}{x-2}\right|+C$

5. $\int \frac{dx}{x\cdot\ln x} = ?$

A) $\ln|x|+C$ B) $\ln|x|+x+C$

C) $\ln|x|-x+C$ D) $\ln|\ln|x||+C$

E) $\ln|x|+\frac{x}{2}+C$

6. $\int \frac{dx}{x\cdot\sqrt[3]{\ln x}} = ?$

A) $\frac{2}{3}\cdot\sqrt[3]{(\ln x)^2}+C$ B) $\frac{2}{3}\sqrt{\ln x}+C$

C) $\frac{2}{3}\sqrt{(\ln x)^3}+C$ D) $\frac{3}{2}\sqrt{(\ln x)^3}+C$

E) $\frac{3}{2}\sqrt[3]{(\ln x)^2}+C$

7. $\int \frac{dx}{(x+3)\ln(x+3)} = ?$

A) $\ln|x+3|+C$ B) $\ln^2|x+3|+C$

C) $\ln|\ln|x+3||+C$ D) $\ln\left|\frac{1}{\ln|x+3|}\right|+C$

E) $\frac{1}{\ln|x+3|}+C$

8. $\int \frac{x\,dx}{3x^2+5} = ?$

A) $\frac{1}{3}\ln|3x^2+5|+C$ B) $\frac{1}{3}\ln|x^2+5|+C$

C) $\frac{1}{6}\ln|x^2+5|+C$ D) $\frac{1}{6}\ln|3x^2+5|+C$

E) $\frac{1}{6}\ln|3x^2-5|+C$

9. $\int \frac{e^x dx}{\sqrt{3+e^x}} = ?$

A) $3\sqrt{3e^x} + C$

B) $3\sqrt{3+e^x} + C$

C) $2\sqrt{3+e^x} + C$

D) $2\sqrt{3e^x} + C$

E) $\frac{1}{2}\sqrt{3+e^x} + C$

10. $\int \frac{x \cdot \ln(x^2+1)}{x^2+1} dx = ?$

A) $x^2 + \ln(x^2+1) + C$

B) $\ln(x^2+1) + C$

C) $\frac{x^2}{2} + \ln(x^2+1) + C$

D) $\frac{1}{2} + \ln(x^2+1) + C$

E) $\frac{\ln^2(x^2+1)}{4} + C$

11. $\int e^x \cdot \cos e^x dx = ?$

A) $\tan e^x + C$

B) $\cos e^x + C$

C) $e^x \cdot \cos x + C$

D) $\sin e^x + C$

E) $e^x \cdot \sin e^x + C$

12. $\int \sin^2 x \cdot \sin 2x \, dx = ?$

A) $\sin^2 x + C$

B) $\cos^2 x + C$

C) $\sin^3 x + C$

D) $\frac{\cos^3 x}{3} + C$

E) $\frac{\sin^4 x}{2} + C$

13. $\int \frac{\cos x - \sin x}{\sin x + \cos x} dx = ?$

A) $\ln|\sin x - \cos x| + C$

B) $\ln|\cos x - \sin x| + C$

C) $\ln|\sin 2x| + C$

D) $\ln|\sin x + \cos x| + C$

E) $\ln|\sin x| + C$

14. $\int \frac{3^x}{\sqrt{3^x+1}} dx = ?$

A) $\frac{3}{\ln 3}\sqrt{3^x+1} + C$

B) $-\frac{3}{\ln 3}(3^x+1) + C$

C) $\frac{1}{\ln 3}(3^x+1) + c$

D) $-\frac{3}{\ln 3}\sqrt[3]{3^x+1} + C$

E) $\frac{2}{\ln 3}\sqrt{3^x+1} + C$

15. $\int \frac{dx}{4+9x^2} = ?$

A) $\frac{1}{6}\arctan 3x + C$

B) $\frac{2}{3}\arctan\left(\frac{2}{3}x\right) + C$

C) $\frac{1}{6}\arctan\frac{3x}{2} + C$

D) $\frac{3}{2}\arctan\frac{3x}{2} + C$

E) $\frac{1}{3}\arctan 3x + C$

16. $\int \frac{dx}{\sqrt{3-x^2}} = ?$

A) $\frac{1}{3}\arcsin\frac{x}{3} + C$

B) $\frac{1}{3}\arcsin x + C$

C) $\arcsin\frac{x}{3} + C$

D) $\frac{1}{\sqrt{3}}\arcsin\frac{x}{\sqrt{3}} + C$

E) $\arcsin\frac{x}{\sqrt{3}} + C$

Yanıtlar / Answers

1. D	**4. C**	**7. C**	**10. E**	**13. D**	**16. E**
2. B	**5. D**	**8. D**	**11. D**	**14. E**	
3. E	**6. E**	**9. C**	**12. E**	**15. C**	

1. $t=x^2 \Rightarrow dt=2x\,dx \Rightarrow \frac{1}{2}dt=x\,dx$

$$\int x\cdot(e)^{x^2}dx=\int(e)^{x^2}\cdot x\,dx$$
$$=\int e^t\cdot\frac{1}{2}dt=\frac{1}{2}\int e^t\,dt$$
$$=\frac{1}{2}\cdot e^t+C$$
$$=\frac{1}{2}\cdot(e)^{x^2}+C$$

Yanıt / Answer D

2. $t=x^2-3x \Rightarrow dt=(2x-3)\,dx$

$$\int\frac{2x-3}{x^2-3x}dx=\int\frac{dt}{t}$$
$$=\ln|t|+C$$
$$=\ln|x^2-3x|+C$$

Yanıt / Answer B

3. $t=x^2+2x-1 \Rightarrow dt=2(x+1)\,dx \Rightarrow \frac{1}{2}dt=(x+1)\,dx$

$$\int(x+1)(x^2+2x-1)^3dx=\int\frac{1}{2}\cdot t^3\,dt=\frac{1}{2}\int t^3\,dt$$
$$=\frac{1}{2}\left(\frac{t^{3+1}}{3+1}\right)+C$$
$$=\frac{1}{2}\cdot\frac{t^4}{4}+C$$
$$=\frac{1}{8}\cdot(x^2+2x-1)^4+C$$

Yanıt / Answer E

4. $t=x^2-4 \Rightarrow dt=2x\,dx$

$$\int\frac{2x\,dx}{x^2-4}=\int\frac{dt}{t}=\ln|t|+C$$
$$=\ln|x^2-4|+C$$

Yanıt / Answer C

5. $t=\ln x \Rightarrow dt=\frac{1}{x}dx$

$$\int\frac{dx}{x\cdot\ln x}=\int\frac{1}{t}dt=\ln|t|+C$$
$$=\ln|\ln x|+C$$

Yanıt / Answer D

6. $t=\ln x \Rightarrow dt=\frac{1}{x}dx$

$$\int\frac{dx}{x\cdot\sqrt[3]{\ln x}}=\int\frac{dt}{\sqrt[3]{t}}=\int\frac{dt}{t^{\frac{1}{3}}}$$
$$=\int t^{-\frac{1}{3}}dt=\frac{t^{-\frac{1}{3}+1}}{-\frac{1}{3}+1}+C$$
$$=\frac{3}{2}\cdot t^{\frac{2}{3}}+C=\frac{3}{2}\cdot(\ln x)^{\frac{2}{3}}+C$$
$$=\frac{3}{2}\cdot\sqrt[3]{(\ln x)^2}+C$$

Yanıt / Answer E

7. $t=\ln(x+3) \Rightarrow dt=\frac{1}{x+3}dx$

$$\int\frac{dx}{(x+3)\ln(x+3)}=\int\frac{dt}{t}=\ln|t|+C$$
$$=\ln|\ln|x+3||+C$$

Yanıt / Answer C

8. $t=3x^2+5 \Rightarrow dt=6x\,dx \Rightarrow \frac{1}{6}dt=x\,dx$

$$\int\frac{x\,dx}{3x^2+5}=\frac{1}{6}\int\frac{dt}{t}$$
$$=\frac{1}{6}\ln|t|+C$$
$$=\frac{1}{6}\cdot\ln|3x^2+5|+C$$

Yanıt / Answer D

9. $t=3+e^x \Rightarrow dt=e^x dx$

$$\int \frac{e^x dx}{\sqrt{3+e^x}} = \int \frac{dt}{\sqrt{t}} = \int \frac{dt}{t^{\frac{1}{2}}}$$

$$= \int t^{-\frac{1}{2}} dt = \frac{t^{-\frac{1}{2}+1}}{-\frac{1}{2}+1}+C$$

$$= 2\sqrt{t}+C = 2\sqrt{3+e^x}+C$$

Yanıt / Answer C

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10. $t=\ln(x^2+1) \Rightarrow dt=\frac{2x}{x^2+1}dx \Rightarrow \frac{1}{2}dt=\frac{x}{x^2+1}dx$

$$\int \frac{x\cdot\ln(x^2+1)}{x^2+1}dx = \frac{1}{2}\int t\,dt$$

$$= \frac{1}{2}\cdot\frac{t^{1+1}}{1+1}+C$$

$$= \frac{1}{2}\cdot\frac{t^2}{2}+C$$

$$= \frac{1}{4}\cdot\left[\ln(x^2+1)\right]^2+C$$

Yanıt / Answer E

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11. $t=e^x \Rightarrow dt=e^x dx$

$$\int e^x\cdot\cos e^x dx = \int \cos t\, dt$$

$$= \sin t + C$$

$$= \sin e^x + C$$

Yanıt / Answer D

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12. $t=\sin x \Rightarrow dt=\cos x\, dx$

$$\int \sin^2 x\cdot 2\sin x\cdot\cos x\, dx = 2\int \sin^3 x\cdot\cos x\, dx$$

$$= 2\int t^3 dt$$

$$= 2\cdot\frac{t^4}{4}+C = \frac{(\sin x)^4}{2}+C$$

Yanıt / Answer E

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13. $t=\sin x+\cos x \Rightarrow dt=(\cos x-\sin x)\,dx$

$$\int \frac{\cos x-\sin x}{\sin x+\cos x}dx = \int \frac{dt}{t}$$

$$= \ln|t|+C$$

$$= \ln|\sin x+\cos x|+C$$

Yanıt / Answer D

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14. $t=1+3^x \Rightarrow dt=3^x\cdot\ln 3\, dx \Rightarrow \frac{1}{\ln 3}dt=3^x dx$

$$\int \frac{3^x}{\sqrt{1+3^x}}dx = \frac{1}{\ln 3}\int \frac{dt}{\sqrt{t}}$$

$$= \frac{1}{\ln 3}\int t^{-\frac{1}{2}} dt = \frac{1}{\ln 3}\cdot\frac{t^{\frac{1}{2}}}{\frac{1}{2}}+C$$

$$= \frac{2}{\ln 3}\sqrt{1+3^x}+C$$

Yanıt / Answer E

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15. $t=\frac{3x}{2} \Rightarrow dt=\frac{3}{2}dx \Rightarrow \frac{2}{3}dt=dx$

$$\int \frac{dx}{4+9x^2} = \int \frac{dx}{4\left(1+\frac{9x^2}{4}\right)}$$

$$= \frac{1}{4}\int \frac{dx}{1+\left(\frac{3x}{2}\right)^2}$$

$$= \frac{1}{4}\cdot\frac{2}{3}\int \frac{dt}{1+t^2}$$

$$= \frac{1}{6}\cdot\arctan(t)+C = \frac{1}{6}\cdot\arctan\left(\frac{3x}{2}\right)+C$$

Yanıt / Answer C

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16. $t=\frac{x}{\sqrt{3}} \Rightarrow dt=\frac{1}{\sqrt{3}}dx \Rightarrow \sqrt{3}\,dt=dx$

$$\int \frac{dx}{\sqrt{3-x^2}} = \int \frac{dx}{\sqrt{3\left(1-\frac{x^2}{3}\right)}} = \int \frac{dx}{\sqrt{3}\cdot\sqrt{1-\frac{x^2}{3}}}$$

$$= \frac{1}{\sqrt{3}}\int \frac{dx}{\sqrt{1-\left(\frac{x}{\sqrt{3}}\right)^2}} = \frac{1}{\sqrt{3}}\int \frac{\sqrt{3}\,dt}{\sqrt{1-t^2}}$$

$$= \frac{\sqrt{3}}{\sqrt{3}}\int \frac{dt}{\sqrt{1-t^2}} = \arcsin t + C$$

$$= \arcsin\left(\frac{x}{\sqrt{3}}\right)+C$$

Yanıt / Answer E

1. $\int\left(\frac{x^3+x^2+2x}{x^4}\right)dx=?$

A) $\ln|x|-\frac{1}{x}+\frac{1}{x^2}+C$

B) $\ln|x|-\frac{1}{x}-\frac{1}{x^2}+C$

C) $\ln|x|-\frac{x^{-3}}{3}-\frac{x^{-2}}{2}+C$

D) $\ln|x|+\frac{1}{x^2}+C$

E) $\frac{1}{x}+\frac{1}{x^2}+C$

2. $\int\frac{2}{1-x^2}\,dx=?$

A) $\frac{1}{2}\ln|1-x^2|+C$

B) $-\ln|x^2-1|+C$

C) $\frac{1}{2}\ln\left|\frac{x-1}{x+1}\right|+C$

D) $\ln\left|\frac{x+1}{x-1}\right|+C$

E) $2\ln\left|\frac{x-1}{x+1}\right|+C$

3. $\int\frac{x^2+2x+2}{x+1}dx=?$

A) $\frac{x^2}{2}+x+\ln|x+1|+C$

B) $\frac{x^2}{2}-x+\ln|x+1|+C$

C) $\frac{x^2}{2}-x-\ln|x+1|+C$

D) $\frac{x^2}{2}+2x+\ln|x+1|+C$

E) $\frac{x^2}{2}+2x+2\ln|x+1|+C$

4. $\int\frac{x}{x+2}dx=?$

A) $x+2\ln|x+2|+C$

B) $x-2\ln|x-2|+C$

C) $x+\ln|x+2|+C$

D) $x-\ln|x-2|+C$

E) $x-2\ln|x+2|+C$

5. $\int\left(\frac{x-2}{x-1}\right)dx=?$

A) $x-\ln|x-1|+C$

B) $x-\ln|x-2|+C$

C) $x-2+\ln|x|+c$

D) $\ln\left|\frac{x-2}{x-1}\right|+C$

E) $2x+\ln|x-1|+C$

6. $\int\frac{x+5}{x^2+4x+3}dx=?$

A) $\ln|x-3|+2\ln|x+1|+C$

B) $\ln|x+3|+2\ln|x+1|+C$

C) $-\ln|x+3|+2\ln|x+1|+C$

D) $-\ln|x+3|-2\ln|x+1|+C$

E) $\ln|x+3|-2\ln|x+1|+C$

7. $\int\frac{x\cdot dx}{x+1}=?$

A) $x+\ln|x+1|+C$

B) $x-\ln|x+1|+C$

C) $\frac{x}{2}+\ln|x+1|+C$

D) $\frac{x}{2}-\ln|x+1|+C$

E) $\frac{x-\ln|x+1|}{2}+C$

8. $\int\frac{x-1}{x^2+x}dx=?$

A) $\ln|x|+\ln|x+1|+C$

B) $\ln|x|+2\ln|x+1|+C$

C) $-\ln|x|+\ln|x+1|+C$

D) $-\ln|x|+2\ln|x+1|+C$

E) $-\ln|x|-2\ln|x+1|+C$

9. $\displaystyle\int \frac{x^2+x+1}{x^3+x}\,dx = ?$

A) $\ln|x| + \arctan x + C$

B) $\ln|x| + \ln|x^2+x| + C$

C) $x + \arctan x + C$

D) $x^2 + \ln|x^2+x| + C$

E) $\ln|x| - \arctan x + C$

10. $\displaystyle\int \frac{x^4+x}{x^2+1}\,dx = ?$

A) $\dfrac{x^3}{3} - x + \dfrac{1}{2}\ln|x^2+1| + \arctan x + C$

B) $\dfrac{x^3}{3} - x + \ln|x^2+1| + \arctan x + C$

C) $\dfrac{x^3}{3} + x + \dfrac{1}{2}\ln|x^2+1| + \arcsin x + C$

D) $\dfrac{x^3}{3} + x + \dfrac{1}{2}\ln|x^2+1| + \arctan x + C$

E) $\dfrac{x^3}{3} - x + \dfrac{1}{2}\ln|x^2+1| + \arcsin x + C$

11. $\displaystyle\int \frac{2x^2+3x+2}{x+1}\,dx = ?$

A) $x^2+x+\ln|x+1|+C$

B) $x^2+x+\ln|x|+C$

C) $\dfrac{x^2}{2}+x+\ln|x+1|+C$

D) $x^2+x-\dfrac{\ln|x+1|}{4}+C$

E) $x^2+x+\dfrac{\ln|x+1|}{4}+C$

12. $\displaystyle\int \frac{dx}{x^2-4x+8} = ?$

A) $\dfrac{1}{2}\arctan\left(\dfrac{x-2}{2}\right)+C$

B) $\dfrac{1}{2}\operatorname{arccot}\left(\dfrac{x-2}{2}\right)+C$

C) $\dfrac{1}{2}\arctan(x-2)+C$

D) $\dfrac{1}{2}\operatorname{arccot}(x-2)+C$

E) $\arctan\left(\dfrac{x-2}{2}\right)+C$

13. $\displaystyle\int \frac{dx}{9+16x^2} = ?$

A) $\dfrac{1}{2}\arctan\dfrac{x}{3}+C$

B) $\dfrac{1}{4}\arctan\dfrac{x}{3}+C$

C) $\dfrac{1}{8}\arctan\dfrac{2x}{3}+C$

D) $\dfrac{1}{8}\arctan\dfrac{4x}{3}+C$

E) $\dfrac{1}{12}\arctan\dfrac{4x}{3}+C$

14. $\displaystyle\int \frac{3}{\sqrt{9-x^2}}\,dx = ?$

A) $\arcsin\dfrac{x}{3}+C$

B) $3\cdot\arcsin\dfrac{x}{3}+C$

C) $\dfrac{\arcsin\frac{x}{3}}{3}+C$

D) $\dfrac{\arcsin\frac{x}{3}}{2}+C$

E) $2\cdot\arcsin\dfrac{x}{3}+C$

Yanıtlar / Answers

1. B	4. E	7. B	10. A	13. E
2. D	5. A	8. D	11. A	14. B
3. A	6. C	9. A	12. A	

1. $\int\left(\frac{x^3+x^2+2x}{x^4}\right)dx=\int\left(\frac{x^3}{x^4}+\frac{x^2}{x^4}+\frac{2x}{x^4}\right)dx$

$=\int\left(\frac{1}{x}+\frac{1}{x^2}+\frac{2}{x^3}\right)dx$

$=\int\frac{1}{x}dx+\int x^{-2}\,dx+2\int x^{-3}\,dx$

$=\ln|x|+\frac{x^{-2+1}}{-2+1}+2\cdot\frac{x^{-3+1}}{-3+1}+C$

$=\ln|x|-\frac{1}{x}-\frac{1}{x^2}+C$

Yanıt / Answer B

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2. $\frac{2}{1-x^2}=\underset{(1+x)}{\frac{1}{1-x}}+\underset{(1-x)}{\frac{1}{1+x}}$

$\int\frac{2}{1-x^2}dx=\int\left(\frac{1}{1-x}+\frac{1}{1+x}\right)dx$

$=-\ln|1-x|+\ln|1+x|+C$

$=\ln\left|\frac{1+x}{1-x}\right|+C$

Yanıt / Answer D

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3. $\int\frac{x^2+2x+2}{x+1}dx=\int\left(x+1+\frac{1}{x+1}\right)dx$

$=\int(x+1)\,dx+\int\frac{1}{x+1}dx$

$=\frac{x^{1+1}}{1+1}+x+\int\frac{1}{x+1}dx$

$=\frac{x^2}{2}+x+\ln|x+1|+C$

Yanıt / Answer A

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4. $\int\frac{x}{x+2}dx=\int\left(1-\frac{2}{x+2}\right)dx=\int 1\,dx-2\int\frac{dx}{x+2}$

$=x-2\ln|x+2|+C$

Yanıt / Answer E

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5. $\int\left(\frac{x-2}{x-1}\right)dx=\int\left(1-\frac{1}{x-1}\right)dx=\int 1\,dx-\int\frac{dx}{x-1}$

$=x-\ln|x-1|+C$

Yanıt / Answer A

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6. $\frac{x+5}{x^2+4x+3}=\underset{(x+3)}{\frac{A}{x+1}}+\underset{(x+1)}{\frac{B}{x+3}}$

$A(x+3)+B(x+1)=x+5$

$x=-3\Rightarrow B\cdot(-2)=2$

$B=-1$

$x=-1\Rightarrow 2\cdot A=4$

$A=2$

$\int\frac{x+5}{x^2+4x+3}dx=\int\left(\frac{2}{x+1}-\frac{1}{x+3}\right)dx$

$=2\int\frac{1}{x+1}dx-\int\frac{1}{x+3}dx$

$=2\ln|x+1|-\ln|x+3|+C$

Yanıt / Answer C

7. $$\int \frac{x}{x+1}\,dx=\int\left(1-\frac{1}{x+1}\right)dx=\int 1\,dx-\int\frac{1}{x+1}\,dx$$
$$=x-\ln|x+1|+C$$

Yanıt / Answer B

8. $$\frac{x-1}{x(x+1)}=\underset{(x+1)}{\frac{A}{x}}+\underset{(x)}{\frac{B}{x+1}}$$
$$x-1=x(A+B)+A$$
$$A=-1,\ (A+B)=1\Rightarrow B=2$$
$$\int\frac{x-1}{x^2+x}\,dx=\int\left(\frac{-1}{x}+\frac{2}{x+1}\right)dx$$
$$=-\ln|x|+2\ln|x+1|+C$$

Yanıt / Answer D

9. $$\frac{x^2+x+1}{x^3+x}=\underset{(x^2+1)}{\frac{A}{x}}+\underset{(x)}{\frac{Bx+C}{x^2+1}}$$
$$x^2+x+1=Ax^2+A+Bx^2+Cx$$
$$x^2+x+1=x^2(A+B)+Cx+A$$
$$A+B=1,\quad C=1,\quad A=1,\quad B=0$$
$$\int\frac{x^2+x+1}{x^3+x}\,dx=\int\left(\frac{1}{x}+\frac{1}{x^2+1}\right)dx$$
$$=\int\frac{1}{x}\,dx+\int\frac{1}{1+x^2}\,dx$$
$$=\ln|x|+\arctan x+C$$

Yanıt / Answer A

10. $t=x^2+1\Rightarrow dt=2x\,dx\Rightarrow\frac{1}{2}dt=x\,dx$

$$\int\frac{x^4+x}{x^2+1}\,dx=\int\left(x^2-1+\frac{x+1}{x^2+1}\right)dx$$
$$=\int(x^2-1)\,dx+\int\frac{x}{x^2+1}\,dx+\int\frac{1}{1+x^2}\,dx$$
$$=\frac{x^3}{3}-x+\frac{1}{2}\cdot\int\frac{dt}{t}+\arctan x+C$$
$$=\frac{x^3}{3}-x+\frac{1}{2}\cdot\ln\left|x^2+1\right|+\arctan x+C$$

Yanıt / Answer A

11. $$\begin{array}{r|l} 2x^2+3x+2 & x+1 \\ \cline{2-2} - & 2x+1 \\ \hline 1 & \end{array}\Rightarrow\frac{2x^2+3x+2}{x+1}=2x+1+\frac{1}{x+1}$$
$$\int\frac{2x^2+3x+2}{x+1}\,dx=\int\left((2x+1+\frac{1}{x+1}\right)dx$$
$$=x^2+x+\ln|x+1|+C$$

Yanıt / Answer A

12. $t=\frac{x-2}{2}\Rightarrow dt=\frac{1}{2}dx\Rightarrow dx=2\,dt$

$$\int\frac{dx}{x^2-4x+8}=\int\frac{dx}{4+x^2-4x+4}$$
$$=\int\frac{dx}{4+(x-2)^2}=\int\frac{dx}{4\left[1+\frac{(x-2)^2}{4}\right]}$$
$$=\frac{1}{4}\int\frac{dx}{1+(\frac{x-2}{2})^2}$$
$$=\frac{1}{4}\cdot2\int\frac{dt}{1+t^2}=\frac{1}{2}\cdot\arctan t+C$$
$$=\frac{1}{2}\cdot\arctan\left(\frac{x-2}{2}\right)+C$$

Yanıt / Answer A

13. $t=\frac{4x}{3}\Rightarrow dt=\frac{4}{3}dx\Rightarrow\frac{3}{4}dt=dx$

$$\int\frac{dx}{9+16x^2}=\int\frac{dx}{9\left(1+\frac{16x^2}{9}\right)}=\frac{1}{9}\int\frac{dx}{1+\left(\frac{4x}{3}\right)^2}$$
$$=\frac{1}{9}\cdot\frac{3}{4}\int\frac{dt}{1+t^2}$$
$$=\frac{1}{12}\cdot\arctan\left(\frac{4x}{3}\right)+C$$

Yanıt / Answer E

14. $t=\frac{x}{3}\Rightarrow dt=\frac{1}{3}dx\Rightarrow 3\cdot dt=dx$

$$\int\frac{3}{\sqrt{9-x^2}}dx=3\int\frac{dx}{\sqrt{9\left(1-\frac{x^2}{9}\right)}}=\frac{1}{3}\int\frac{dx}{\sqrt{1-\frac{x^2}{9}}}$$
$$=3\cdot\frac{1}{3}\int\frac{dx}{\sqrt{1-\left(\frac{x}{3}\right)^2}}$$
$$=3\int\frac{dt}{\sqrt{1-t^2}}=3\arcsin\frac{x}{3}+C$$

Yanıt / Answer B

1. $\int x \cdot 2^x \cdot dx = ?$

A) $\frac{1}{\ln 2} \cdot x \cdot 2^x - \frac{1}{\ln 2} \cdot \frac{2^x}{\ln 2} + C$

B) $\frac{1}{\ln 2} \cdot 2^x - 2^x + C$

C) $\frac{1}{\ln 2} \cdot 2^x + \frac{1}{\ln 2} \cdot \frac{2^x}{\ln 2} + C$

D) $\frac{1}{\ln 2} \cdot 2^x + 2^x + C$

E) $\ln 2 \cdot 2^x + \frac{1}{\ln 2} \cdot \frac{2^x}{\ln 2} + C$

2. $\int x \cdot \sin x \, dx = ?$

A) $x \cdot \cos x + \sin x + C$

B) $x \sin x + \cos x + C$

C) $-x \cdot \cos x + \sin x + C$

D) $-x \cdot \sin x + \cos x + C$

E) $-x \cdot \cos x - \sin x + C$

3. $\int \ln x \, dx = ?$

A) $x \ln x + x + C$

B) $x \ln x - x + C$

C) $x + \ln x + C$

D) $x - \ln x + C$

E) $\ln x - x + C$

4. $\int 2x \cdot e^x \cdot dx = ?$

A) $2x \cdot e^x - e^x + C$

B) $2xe^x + e^x + C$

C) $2xe^x - 4e^x + C$

D) $2xe^x + 4e^x + C$

E) $2xe^x - 2e^x + C$

5. $\int \arctan x \, dx = ?$

A) $x \arctan x - \frac{1}{2} \ln x^2 - \frac{x^2}{2} + C$

B) $x \arctan x + \frac{1}{2} \ln|x| + \frac{x^2}{2} + C$

C) $x \arctan x - \frac{1}{2} \ln|x| + \frac{x^2}{2} + C$

D) $x \arctan x - \frac{1}{2} \ln|1+x^2| + C$

E) $x \arctan x + \frac{1}{2} \ln|1+x^2| + C$

6. $\int x^2 \cdot e^x dx = ?$

A) $e^x (x^2 - 2x + 2) + C$

B) $e^x (x^2 + 2x + 2) + C$

C) $e^x (x^2 - 2x - 2) + C$

D) $e^x (x^2 + 2x - 2) + C$

E) $e^x (x^2 - x + 2) + C$

7. $\int x^3 \cdot e^x \cdot dx = ?$

A) $e^x(6x^2 + 6x) + C$
B) $e^x(2x^3 + 3x^2 - 6x + 5) + C$
C) $e^x(2x^3 - 3x^2 - 6x + 5) + C$
D) $e^x(2x^3 - 3x^2 + 6x + 5) + C$
E) $e^x(x^3 - 3x^2 + 6x - 6) + C$

8. $\int x \cdot \cos x dx = ?$

A) $x \cos x + \sin x + C$
B) $x \cos x - \sin x + C$
C) $x \sin x + \cos x + C$
D) $x \sin x - \cos x + C$
E) $x \sin x + \sin x + C$

9. $\int \frac{x dx}{\cos^2 x} = ?$

A) $x \tan x - \ln|\cos x| + C$
B) $x \tan x + \ln|\cos x| + C$
C) $x \tan x + \ln|\sin x| + C$
D) $x \tan x - \ln|\sin x| + C$
E) $x \tan x + \cos x + C$

10. $\int x \ln x \, dx = ?$

A) $\frac{x^2 \ln x}{2} - \frac{x^2}{4} + C$
B) $\frac{x \ln x}{2} - \frac{x^2}{4} + C$
C) $\frac{x^2 \ln x}{2} - \frac{x^2}{2} + C$
D) $\frac{\ln x}{2} + \frac{x^2}{4} + C$
E) $\ln x \cdot x^2 + \frac{x^2}{4} + C$

11. $\int \ln(\sin x) \cdot \cos x \, dx = ?$

A) $\ln(\sin x) \cdot \cos x - \sin x + C$
B) $\ln(\sin x) \cdot \sin x - \cos x + C$
C) $\ln(\sin x) \cdot \sin x - \sin x + C$
D) $\ln(\sin x) \cdot \cos x + \sin x + C$
E) $\ln(\sin x) \cdot \sin x + \sin x + C$

12. $\int e^x \cdot \sin x \cdot dx = ?$

A) $\frac{e^x(\sin x - \cos x)}{2} + C$
B) $\frac{e^x(\sin x + \cos x)}{2} + C$
C) $e^x(\sin x - \cos x) + C$
D) $e^x(\sin x + \cos x) + C$
E) $\frac{e^x(\cos x - \sin x)}{2} + C$

Yanıtlar / Answers

1. A	3. B	5. D	7. E	9. B	11. C
2. C	4. E	6. A	8. C	10. A	12. A

1. $x = u \qquad 2^x dx = dv$

$dx = du \qquad \dfrac{2^x}{\ln 2} = v$

$$\int x \cdot 2^x dx = x \cdot \frac{2^x}{\ln 2} - \int \frac{2^x}{\ln 2} dx$$

$$= \frac{1}{\ln 2} \cdot x \cdot 2^x - \frac{1}{\ln 2} \int 2^x dx$$

$$= \frac{1}{\ln 2} x \cdot 2^x - \frac{1}{\ln^2 x} \cdot 2^x + C$$

Yanıt / Answer A

2. $x = u \qquad \sin x \, dx = dv$

$dx = du \qquad -\cos x = v$

$$\int x \cdot \sin x \, dx = -x \cdot \cos x - \int (-\cos x) \, dx$$

$$= -x\cos x + \int \cos x \, dx$$

$$= -x\cos x + \sin x + C$$

Yanıt / Answer C

3. $u = \ln x \qquad dv = dx$

$du = \dfrac{1}{x} dx \qquad v = x$

$$\int \ln x \, dx = x \cdot \ln x - \int \frac{1}{x} \cdot x \, dx$$

$$= x \cdot \ln x - \int dx$$

$$= x \ln x - x + C$$

Yanıt / Answer B

4. Türev / Derivative — İntegral / Integral

$$\begin{tikzcd} 2x \arrow[dr] & e^x \\ -2 \arrow[dr] & e^x \\ 0 \arrow[dr] & e^x \\ & e^x \end{tikzcd}$$

$$\int 2x \cdot e^x dx = 2(x \cdot e^x - e^x) + C$$

$$= 2x \cdot e^x - 2e^x + C$$

Yanıt / Answer E

5. $u = \arctan x \qquad dx = dv$

$du = \dfrac{1}{1+x^2} \qquad x = v$

$$\int \arctan x \, dx = x \cdot \arctan x - \int \frac{x}{1+x^2} dx \quad \left[\begin{array}{l} t = 1+x^2 \\ \frac{1}{2} dt = x \, dx \end{array} \right]$$

$$= x \cdot \arctan x - \frac{1}{2} \int \frac{dt}{t}$$

$$= x \cdot \arctan x - \frac{1}{2} \cdot \ln|t| + C$$

$$= x \cdot \arctan x - \frac{1}{2} \cdot \ln\left|1+x^2\right| + C$$

Yanıt / Answer D

6. Türev / Derivative — İntegral / Integral

$$\begin{tikzcd} x^2 \arrow[dr] & e^x \\ -2x \arrow[dr] & e^x \\ 2 \arrow[dr] & e^x \\ 0 \arrow[dr] & e^x \\ & e^x \end{tikzcd}$$

$$\int x^2 \cdot e^x dx = x^2 \cdot e^x - 2x \cdot e^x + 2 \cdot e^x + C$$

$$= e^x\left(x^2 - 2x + 2\right) + C$$

Yanıt / Answer A

7.

Türev / Derivative	İntegral / Integral
x^3	e^x
$-3x^2$	e^x
$6x$	e^x
-6	e^x
0	e^x

$$\int e^x\cdot x^3\,dx = e^x\cdot x^3 - e^x\cdot 3x^2 + e^x\cdot 6x - e^x\cdot 6$$

$$= e^x(x^3 - 3x^2 + 6x - 6) + C$$

Yanıt / Answer E

8.

Türev / Derivative	İntegral / Integral
x	$\cos x$
-1	$\sin x$
0	$-\cos x$
	$-\sin x$

$$\int x\cdot\cos x\ dx = x\cdot\sin x + \cos x + C$$

Yanıt / Answer C

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9. $u = x \qquad \dfrac{1}{\cos^2 x}\,dx = dv$

$du = dx \qquad \tan x = v$

$$\int \frac{x\,dx}{\cos^2 x} = x\cdot\tan x - \int \tan x\,dx$$

$$= x\cdot\tan x - \int \frac{\sin x}{\cos x}\,dx \begin{bmatrix} t = \cos x \\ -dt = \sin x\,dx \end{bmatrix}$$

$$= x\cdot\tan x + \int \frac{dt}{t}$$

$$= x\cdot\tan x + \ln|\cos x| + C$$

Yanıt / Answer B

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10. $u = \ln x \qquad x\ dx = dv$

$du = \dfrac{1}{x}\,dx \qquad \dfrac{x^2}{2} = v$

$$\int x\cdot\ln x\ dx = \frac{x^2}{2}\cdot\ln x - \int \frac{x^2}{2}\cdot\frac{1}{x}\,dx$$

$$= \frac{x^2}{2}\cdot\ln x - \frac{1}{2}\int x\,dx$$

$$= \frac{x^2}{2}\cdot\ln x - \frac{x^2}{4} + C$$

Yanıt / Answer A

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11. $u = \ln(\sin x) \qquad \cos x\,dx = dv$

$du = \dfrac{\cos x}{\sin x}\,dx \qquad \sin x = v$

$$\int \ln(\sin x)\cdot\cos x\,dx = \ln(\sin x)\cdot\sin x - \int \frac{\cos x}{\sin x}\cdot\sin x\,dx$$

$$= \ln(\sin x)\cdot\sin x - \int \cos x\,dx$$

$$= \ln(\sin x)\cdot\sin x - \sin x + C$$

Yanıt / Answer C

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12. $u = \sin x \qquad e^x\,dx = dv$

$du = \cos x \qquad e^x = v$

$$\int e^x\cdot\sin x\,dx = e^x\cdot\sin x - \int e^x\cdot\cos x\,dx$$

$u = \cos x \qquad e^x dx = dv$

$du = -\sin x\,dx \qquad v = e^x$

$$I = e^x\cdot\sin x - \left(e^x\cdot\cos x + \underbrace{\int e^x \sin x\,dx}_{I}\right)$$

$$I = e^x\cdot\sin x - e^x\cdot\cos x - I$$

$$2I = e^x\cdot\sin x + e^x\cdot\cos x$$

$$I = \frac{1}{2}\cdot e^x\cdot\sin x - \frac{1}{2}\cdot e^x\cdot\cos x + C$$

$$= \frac{e^x\cdot(\sin x - \cos x)}{2} + C$$

Yanıt / Answer A

1. $\int \sin^2 x\, dx = ?$

A) $\frac{x}{2}-\frac{\sin 2x}{2}+C$

B) $\frac{x}{2}-\frac{\sin 2x}{4}+C$

C) $\frac{x}{2}+\frac{\sin 2x}{4}+C$

D) $\frac{x}{2}-\frac{\cos 2x}{2}+C$

E) $\frac{x}{2}-\frac{\cos 2x}{4}+C$

2. $\int \cos^3 x\, dx = ?$

A) $-\sin x+\frac{\sin^3 x}{3}+C$

B) $\cos x-\frac{\cos^3 x}{3}+C$

C) $\sin x-\frac{\sin^2 x}{3}+C$

D) $\cos x+\frac{\sin^2 x}{2}+C$

E) $\sin x-\frac{\sin^3 x}{3}+C$

3. $\int \sin^2 x\cdot\cos^3 x\, dx = ?$

A) $\frac{\cos^2 x}{2}-\frac{\cos^4 x}{4}+C$

B) $\frac{\sin^3 x}{3}-\frac{\sin^5 x}{5}+C$

C) $\sin x-\frac{\sin^2 x}{4}+C$

D) $\frac{\sin^3 x}{3}-\frac{\cos^4 x}{4}+C$

E) $\frac{\sin^2 x}{2}+\frac{\cos^3 x}{3}+C$

4. $\int \sin^5 x\, dx = ?$

A) $-\cos x+\frac{2}{3}\cos^3 x-\frac{\cos^5 x}{5}+C$

B) $\sin x-\frac{\sin^3 x}{3}+\frac{\sin^5 x}{5}+C$

C) $x-\frac{2}{3}\sin^3 x+\frac{\sin^5 x}{5}+C$

D) $x-\frac{\sin^3 x}{3}+\frac{\sin^5 x}{5}+C$

E) $x+\frac{\sin^3 x}{3}-\frac{\sin^5 x}{5}+C$

5. $\int \sin 4x\cdot\cos 4x\, dx = ?$

A) $\frac{\cos 8x}{8}+C$

B) $\frac{\cos 8x}{16}+C$

C) $\frac{-\cos 8x}{16}+C$

D) $\frac{\sin 8x}{8}+C$

E) $\frac{\sin 8x}{16}+C$

6. $\int \sin 6x\cdot\cos 2x\, dx = ?$

A) $\frac{\sin 8x}{8}+\frac{\sin 4x}{4}+C$

B) $\frac{\sin 8x}{16}+\frac{\sin 4x}{8}+C$

C) $\frac{\cos 8x}{8}+\frac{\cos 4x}{4}+C$

D) $\frac{\cos 8x}{16}+\frac{\cos 4x}{8}+C$

E) $\frac{-\cos 8x}{16}-\frac{\cos 4x}{8}+C$

7. $\int \frac{\cos x}{1+\sin^2 x}\,dx = ?$

A) $\ln(1+\sin^2 x)+C$

B) $\ln(\sin x)+C$

C) $\arctan(1+\sin x)+C$

D) $\arctan(\sin x)+C$

E) $\ln(\arctan x)+C$

8. $0<x<\frac{\pi}{2} \Rightarrow \int \sqrt{1+\sin 2x}\,dx = ?$

A) $\cos x+\sin x+C$

B) $\cos x-\sin x+C$

C) $\sin x-\cos x+C$

D) $\frac{\sin^2 x}{2}-\frac{\cos^2 x}{2}+C$

E) $\frac{\sin 2x}{2}-\cos x+C$

9. $\int \frac{\sin 2x}{\cos^2 x}\,dx = ?$

A) $2\cos x+C$

B) $\ln|\cos x|+C$

C) $2\ln|\cos x|+C$

D) $-2\ln|\cos x|+C$

E) $\frac{\ln|\cos x|}{2}+C$

10. $\int \sin^3 x\cdot\cos^5 x\,dx = ?$

A) $\frac{\cos^6 x}{6}-\frac{\cos^8 x}{8}+C$

B) $\frac{\cos^8 x}{8}-\frac{\cos^6 x}{6}+C$

C) $\frac{\sin^8 x}{8}-\frac{\sin^6 x}{6}+C$

D) $\frac{\sin^6 x}{6}-\frac{\sin^8 x}{8}+C$

E) $\frac{\sin^6 x}{6}+\frac{\sin^8 x}{8}+C$

11. $\int \frac{\cos x}{1+4\sin^2 x}\,dx = ?$

A) $\arctan(\sin x)+C$

B) $\arctan(\sin 2x)+C$

C) $\frac{\arctan(2\sin x)}{2}+C$

D) $\arctan(2\sin x)+C$

E) $2\cdot\arctan(\sin 2x)+C$

12. $\int \frac{2\ln x}{x}\,dx = ?$

A) $\ln x + C$ B) $\ln^2 x + C$ C) $x\ln x + C$

D) $x^2e^x + C$ E) $xe^x + C$

[YÖS 2010]

Yanıtlar / Answers

1. B	3. B	5. C	7. D	9. D	11. C
2. A	4. A	6. E	8. C	10. B	12. B

1. $\sin^2 x = \frac{1-\cos 2x}{2}$

$$\int \sin^2 x\,dx = \int \frac{1-\cos 2x}{2}\,dx$$
$$= \int \frac{1}{2}\,dx - \frac{1}{2}\int \cos 2x\,dx$$
$$= \frac{x}{2} - \frac{1}{2}\cdot\frac{1}{2}\sin 2x$$
$$= \frac{x}{2} - \frac{1}{4}\sin 2x$$

Yanıt / Answer B

2. $\int \cos^3 x\,dx = \int \cos^2 x \cdot \cos x\,dx$

$$= \int (1-\sin^2 x)\cdot \cos x\,dx$$
$$\left.\begin{aligned}\sin x &= u\\ \cos x\,dx &= du\end{aligned}\right\} \Rightarrow = \int (1-u^2)\,du$$
$$= u - \frac{u^3}{3} + C$$
$$= \sin x - \frac{\sin^3 x}{3} + C$$

Yanıt / Answer A

3. $\int \sin^2 x \cdot \cos^3 x\,dx$

$$= \int \sin^2 x \cdot \cos^2 x \cdot \cos x\,dx$$
$$= \int \sin^2 x \cdot (1-\sin^2 x)\cdot \cos x\,dx$$
$$\sin x = u \;\Rightarrow\; \cos x\,dx = du$$
$$= \int u^2 \cdot (1-u^2)\,du$$
$$= \int (u^2 - u^4)\,du$$
$$= \frac{u^3}{3} - \frac{u^5}{5} + C$$
$$= \frac{\sin^3 x}{3} - \frac{\sin^5 x}{5} + C$$

Yanıt / Answer B

4. $\int \sin^5 x\,dx = \int (\sin^2 x)^2 \cdot \sin x\,dx$

$$= \int (1-\cos^2 x)^2 \cdot \sin x\,dx$$
$$\left.\begin{aligned}\cos x &= u\\ -\sin x\,dx &= du\end{aligned}\right\} \Rightarrow -\int (1-u^2)^2\,du$$
$$= -\int (u^4 - 2u^2 + 1)\,du$$
$$= -\left(\frac{u^5}{5} - \frac{2u^3}{3} + u\right) + C$$
$$= -\frac{\cos^5 x}{5} + \frac{2\cos^3 x}{3} - \cos x + C$$

Yanıt / Answer A

5. $\sin 4x \cdot \cos 4x = \frac{\sin 8x}{2}$

$$\int (\sin 4x \cdot \cos 4x)\,dx = \int \frac{\sin 8x}{2}\,dx$$
$$= \frac{1}{2}\int \sin 8x\,dx$$
$$= -\frac{1}{2}\cdot\frac{1}{8}\cos 8x + C$$
$$= -\frac{1}{16}\cos 8x + C$$

Yanıt / Answer C

6. $\sin 6x \cdot \cos 2x = \frac{1}{2}[\sin 8x + \sin 4x]$

$$\int (\sin 6x \cdot \cos 2x)\,dx = \frac{1}{2}\left(\int \sin 8x\,dx + \int \sin 4x\,dx\right)$$
$$= \frac{1}{2}\left(-\frac{1}{8}\cos 8x - \frac{1}{4}\cos 4x\right)$$
$$= -\frac{1}{8}\cos 4x - \frac{1}{16}\cos 8x$$

Yanıt / Answer E

7. $$\left.\begin{array}{l}\sin x = u\\ \cos x\, dx = du\end{array}\right\} \Rightarrow \int \frac{\cos x}{1+\sin^2 x}\,dx = \int \frac{du}{1+u^2}$$

$$= \arctan(u) + C$$

$$= \arctan(\sin x) + C$$

Yanıt / Answer D

8. $$\int \sqrt{1+\sin 2x}\;dx = \int \sqrt{\sin^2 x + \cos^2 x + \sin 2x}\;dx$$

$$= \int \sqrt{(\sin x + \cos x)^2}$$

$$= \int (\sin x + \cos x)\,dx$$

$$= -\cos x + \sin x + C$$

Yanıt / Answer C

9. $$\left.\begin{array}{l}\cos^2 x = u\\ -\sin 2x dx = du\end{array}\right\} \Rightarrow \int \frac{\sin 2x}{\cos^2 x}\,dx = \int -\frac{du}{u}$$

$$= -\ln|u| + C$$

$$= -\ln|\cos^2 x| + C$$

$$= -2\ln|\cos x| + C$$

Yanıt / Answer D

10. $$\int \sin^3 x \cdot \cos^5 x\,dx = \int \sin x \cdot \sin^2 x \cdot \cos^5 x\,dx$$

$$= \int \sin x(1-\cos^2 x)\cos^5 x\,dx$$

$$= \int \sin x(\cos^5 x - \cos^7 x)\,dx$$

$$\left.\begin{array}{l}\cos x = u\\ -\sin x\,dx = du\end{array}\right\} \Rightarrow -\int (u^5 - u^7)\,du = -\frac{u^6}{6} + \frac{u^8}{8} + C$$

$$= -\frac{\cos^6 x}{6} + \frac{\cos^8 x}{8} + C$$

Yanıt / Answer B

11. $$\left.\begin{array}{l}\sin x = u\\ \cos x\, dx = du\end{array}\right\} \Rightarrow \int \frac{\cos x}{1+4\sin^2 x}\,dx = \int \frac{du}{1+(2u)^2}$$

$$= \frac{\arctan(2\sin x)}{2}$$

Yanıt / Answer C

12. $$\ln x = u \;\Rightarrow\; \frac{1}{x}\,dx = du$$

$$\int \frac{2\ln x}{x}\,dx = \int 2u\,du$$

$$= u^2 + C$$

$$= \ln^2 x + C$$

Yanıt / Answer B

Belirli İntegral / Definite Integral

Test 1

1. $\int_{1}^{2}(3x^2+4x-5)dx=?$

A) 6 B) 7 C) 8 D) 9 E) 10

2. $\int_{0}^{8}\sqrt[3]{x^2}\,dx=?$

A) $\frac{96}{5}$ B) $\frac{81}{5}$ C) $\frac{89}{5}$ D) $\frac{27}{5}$ E) $\frac{12}{5}$

3. $\int_{0}^{\frac{\pi}{2}}(\sin x+\cos x)dx=?$

A) –2 B) –1 C) 0 D) 1 E) 2

4. $\int_{\frac{\pi}{2}}^{\pi}\cos 3x\,dx=?$

A) $-\frac{2}{3}$ B) $-\frac{1}{3}$ C) 0 D) $\frac{1}{3}$ E) $\frac{2}{3}$

5. $\int_{\ln 3}^{\ln 5}e^x dx=?$

A) 0 B) 1 C) 2 D) 3 E) 4

6. $\int_{1}^{e}\frac{1}{x}dx=?$

A) –2 B) –1 C) 0 D) 1 E) 2

7. $\int_{0}^{a}(2x+3)dx=18 \Rightarrow a=?$

A) 1 B) 2 C) 3 D) 4 E) 5

8. $\left(\int_{0}^{a}x^2dx\right)^3=\int_{0}^{a}x^5\,dx \Rightarrow a=?$

A) $\frac{\sqrt[3]{36}}{2}$ B) $\frac{\sqrt[3]{9}}{2}$ C) $\frac{\sqrt[3]{26}}{2}$

D) $\sqrt{12}$ E) $\sqrt[3]{2}$

9. $\int_0^2 (x^3+ax)\,dx = 8 \Rightarrow \mathbf{a=?}$

A) 5 B) 4 C) 3 D) 2 E) 1

10. $\int_m^n (2x+3)\,dx = 50, \quad n-m=5 \Rightarrow \mathbf{m+n=?}$

A) 11 B) 10 C) 9 D) 8 E) 7

11. $\int_0^1 \frac{dx}{1+x^2} = ?$

A) $\frac{\pi}{6}$ B) $\frac{\pi}{4}$ C) $\frac{\pi}{3}$ D) $\frac{\pi}{2}$ E) π

12. $\int_1^3 \frac{x^2+2x-3}{x+3}\,dx = ?$

A) $\frac{1}{3}$ B) $\frac{2}{3}$ C) 1 D) $\frac{3}{2}$ E) 2

13. $\int_0^2 e^{3x}\,dx = ?$

A) $\frac{e^4-1}{3}$ B) $\frac{e^5-1}{3}$ C) $\frac{e^6-1}{3}$ D) $\frac{e^6}{3}$ E) $\frac{e^9}{3}$

14. $\int_0^1 (2x-1)^2\,dx = ?$

A) $\frac{1}{6}$ B) $\frac{1}{4}$ C) $\frac{1}{3}$ D) $\frac{1}{2}$ E) $\frac{2}{3}$

15. $\int_e^{e^3} \frac{\ln x}{x}\,dx = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

16. $\int_1^3 \frac{1}{x\ln 2}\,dx = ?$

A) $\frac{\ln 3}{\ln 2}$ B) $2\ln 2$ C) $\frac{1}{\ln 2}$ D) $\ln 4$ E) e^{2x}

[İSTANBUL ÜNV. YÖS 2013]

Yanıtlar / Answers

1. C	4. D	7. C	10. E	13. C	16. A
2. A	5. C	8. A	11. B	14. C	
3. E	6. D	9. D	12. E	15. C	

1. $$\int_1^2 (3x^2+4x-5)\,dx=\left(3\cdot\frac{x^{2+1}}{2+1}+4\cdot\frac{x^{1+1}}{1+1}-5x\right)\Bigg|_1^2$$

$$=\left(3\cdot\frac{x^3}{3}+4\cdot\frac{x^2}{2}-5x\right)\Bigg|_1^2$$

$$=(x^3+2x^2-5x)\Big|_1^2$$

$$=(2^3+2\cdot2^2-5\cdot2)-(1+2\cdot1-5\cdot1)$$

$$=(8+8-10)-(1+2-5)$$

$$=6-(-2)=6+2=8$$

Yanıt / Answer C

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2. $$\int_0^8 \sqrt[3]{x^2}\,dx=\int_0^8 x^{\frac{2}{3}}\,dx$$

$$=\frac{x^{\frac{2}{3}+1}}{\frac{2}{3}+1}\Bigg|_0^8=\frac{x^{\frac{5}{3}}}{\frac{5}{3}}\Bigg|_0^8$$

$$=\frac{3}{5}\cdot8^{\frac{5}{3}}-\frac{3}{5}\cdot0$$

$$=\frac{3}{5}\cdot2^5=\frac{3}{5}\cdot32=\frac{96}{5}$$

Yanıt / Answer A

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3. $$\int_0^{\frac{\pi}{2}}(\sin x+\cos x)\,dx=(-\cos x+\sin x)\Big|_0^{\frac{\pi}{2}}$$

$$=\left(-\cos\frac{\pi}{2}+\sin\frac{\pi}{2}\right)-(-\cos0+\sin0)$$

$$=(-0+1)-(-1+0)=1+1=2$$

Yanıt / Answer E

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4. $$\int_{\frac{\pi}{2}}^{\pi}\cos3x\,dx=\frac{1}{3}\cdot(\sin3x)\Big|_{\frac{\pi}{2}}^{\pi}=\frac{1}{3}\left(\sin3\pi-\sin\frac{3\pi}{2}\right)$$

$$=\frac{1}{3}\cdot(0+1)=\frac{1}{3}$$

Yanıt / Answer D

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5. $$\int_{\ln3}^{\ln5}e^x\,dx=e^x\Big|_{\ln3}^{\ln5}=e^{\ln5}-e^{\ln3}$$

$$=5-3=2$$

Yanıt / Answer C

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6. $$\int_1^e\frac{1}{x}\,dx=\ln|x|\Big|_1^e=\ln e-\ln1=1-0=1$$

Yanıt / Answer D

---

7. $$\int_0^a(2x+3)\,dx=2\cdot\frac{x^2}{2}+3x\Big|_0^a=18$$

$$(a^2+3a)-0=18$$

$$a^2+3a-18=0$$

$$(a+6)(a-3)=0\Rightarrow a_1=-6\ ,\ a_2=3$$

$$a>0\Rightarrow a=3$$

Yanıt / Answer C

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8. $$\left(\int_0^a x^2\,dx\right)^3=\int_0^a x^5\,dx\Rightarrow$$

$$\left(\frac{x^3}{3}\Big|_0^a\right)^3=\frac{x^6}{6}\Big|_0^a\Rightarrow\left(\frac{a^3}{3}\right)^3=\frac{a^6}{6}$$

$$\Rightarrow\frac{a^9}{27}=\frac{a^6}{6}\Rightarrow\frac{a^3}{9}=\frac{1}{2}\Rightarrow a^3=\frac{9}{2}$$

$$\Rightarrow a=\frac{\sqrt[3]{9}}{\underset{(\sqrt[3]{4})}{\sqrt[3]{2}}}\Rightarrow a=\frac{\sqrt[3]{9\cdot4}}{2}=\frac{\sqrt[3]{36}}{2}$$

Yanıt / Answer A

9. $\int_0^2 (x^3+ax)\,dx = 8 \Rightarrow$

$$\left(\frac{x^4}{4}+\frac{ax^2}{2}\right)\Bigg|_0^2 = 8$$

$$\left(\frac{16}{4}+\frac{4a}{2}\right)-0=8$$

$$4+2a=8$$

$$2a=4$$

$$a=2$$

Yanıt / Answer D

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10. $\int_m^n (2x+3)\,dx = 50 \Rightarrow$

$$\left(x^2+3x\right)\Big|_m^n = 50$$

$$(n^2+3n)-(m^2+3m)=50$$

$$n^2-m^2+3n-3m=50$$

$$(n-m)(n+m)+3(n-m)=50$$

$$(n-m)(n+m+3)=50$$

$$5(n+m+3)=50$$

$$n+m+3=10$$

$$n+m=7$$

Yanıt / Answer E

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11. $\int_0^1 \frac{dx}{1+x^2} = \arctan x\Big|_0^1 = \arctan 1 - \arctan 0$

$$= \frac{\pi}{4}-0=\frac{\pi}{4}$$

Yanıt / Answer B

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12. $\int_1^3 \frac{x^2+2x-3}{x+3}\,dx = \int_1^3 \frac{(x+3)(x-1)}{x+3}\,dx = \int_1^3 (x-1)\,dx$

$$= \left(\frac{x^2}{2}-x\right)\Bigg|_1^3 = \left(\frac{9}{2}-3\right)-\left(\frac{1}{2}-1\right)$$

$$= \left(\frac{3}{2}\right)-\left(-\frac{1}{2}\right)=\frac{3}{2}+\frac{1}{2}=2$$

Yanıt / Answer E

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13. $\int_0^2 e^{3x}\,dx = \frac{1}{3}\cdot e^{3x}\Big|_0^2$

$$= \frac{1}{3}\cdot e^6 - \frac{1}{3}\cdot e^0$$

$$= \frac{e^6-1}{3}$$

Yanıt / Answer C

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14. $t = 2x-1 \Rightarrow \frac{1}{2}\,dt = dx$

$x=0 \Rightarrow t=-1$

$x=1 \Rightarrow t=1$

$$\int_0^1 (2x-1)^2\,dx = \int_{-1}^1 \frac{1}{2}\cdot t^2\,dt = \frac{1}{2}\cdot\frac{t^3}{3}\Bigg|_{-1}^1 = \frac{1}{6}\cdot t^3\Bigg|_{-1}^1$$

$$= \frac{1}{6}\cdot(1)^3 - \frac{1}{6}\cdot(-1)^3$$

$$= \frac{1}{6}+\frac{1}{6}=\frac{2}{6}=\frac{1}{3}$$

Yanıt / Answer C

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15. $t = \ln x \Rightarrow dt = \frac{1}{x}\,dx$

$x=e^3 \Rightarrow t=3$

$x=e \Rightarrow t=1$

$$\int_e^{e^3} \frac{\ln x}{x}\,dx = \int_1^3 t\,dt = \frac{t^{1+1}}{1+1}\Bigg|_1^3 = \frac{t^2}{2}\Bigg|_1^3$$

$$= \frac{9}{2}-\frac{1}{2}=\frac{8}{2}=4$$

Yanıt / Answer C

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16. $\int_1^3 \frac{1}{x\ln 2}\,dx = \frac{1}{\ln 2}\int_1^3 \frac{1}{x}\,dx = \frac{1}{\ln 2}\ln x\Big|_1^3$

$$= \frac{1}{\ln 2}[\ln 3 - \ln 1]$$

$$= \frac{\ln 3}{\ln 2}$$

Yanıt / Answer A

1. $\int_0^{\frac{\pi}{2}} \cos^3 t \, dt = ?$

A) $\frac{1}{2}$ B) $\frac{2}{3}$ C) $\frac{3}{4}$ D) 2 E) 3

2. $\int_0^{\frac{\pi}{12}} \sin^3 2x \cdot \sin 4x \, dx = ?$

A) $\frac{1}{64}$ B) $\frac{1}{18}$ C) $\frac{8}{49}$ D) $\frac{3}{80}$ E) $\frac{1}{160}$

3. $\int_1^2 \frac{2}{x^2-2x+2} dx = ?$

A) 2π B) π C) $\frac{\pi}{2}$ D) $\frac{\pi}{4}$ E) $\frac{\pi}{8}$

4. $\int_1^2 \frac{2}{x^2+6x+8} dx = ?$

A) $\ln\frac{3}{4}$ B) $\ln\frac{9}{10}$ C) $\ln\frac{9}{16}$

D) $\ln\frac{20}{9}$ E) $\ln\frac{10}{9}$

5. $\int_0^{\pi^2/4} \frac{\cos\sqrt{x}}{2\sqrt{x}} dx = ?$

A) – 1 B) 0 C) 1 D) 2 E) 3

6. $\int_1^{\sqrt{3}} \frac{x}{\sqrt{x^2+5}} dx = ?$

A) $\sqrt{6}-\sqrt{5}$ B) $2\sqrt{7}$ C) $\sqrt{2}(2-\sqrt{3})$

D) $\sqrt{2}(\sqrt{7}+\sqrt{3})$ E) $\sqrt{3}(\sqrt{7}-\sqrt{2})$

7. $\int_{0}^{1} x^3 \cdot (1-x^2)^6 \cdot dx = ?$

A) $-\frac{1}{112}$ B) $-\frac{1}{84}$ C) $\frac{1}{84}$ D) $\frac{1}{112}$ E) $\frac{1}{121}$

8. $\int_{\frac{\pi}{2}}^{\pi} \sqrt{2-2\cos 4x}\ dx = ?$

A) –2 B) –1 C) 0 D) 1 E) 2

9. $\int_{0}^{\frac{\pi}{2}} \cos^2 x\, dx = ?$

A) $\frac{3\pi}{4}$ B) $\frac{2\pi}{3}$ C) $\frac{\pi}{3}$ D) $\frac{\pi}{4}$ E) $\frac{\pi}{6}$

10. $\int_{0}^{2} \frac{(2x+1)dx}{\sqrt{x^2+x+1}} = ?$

A) $2\left(\sqrt{7}-1\right)$ B) $\sqrt{6}+1$ C) $3\left(\sqrt{3}-1\right)$

D) $\frac{7}{2}$ E) $\frac{3}{4}$

11. $\int_{0}^{1} e^x dx + \int_{1}^{e} \ln x\, dx = ?$

A) 1 B) 1+ e C) e –1 D) 2e E) e

12. $\int_{e^2}^{e^{12}} \frac{dx}{x \cdot \ln x} = ?$

A) ln10 B) ln6 C) ln4 D) ln3 E) ln2

13. $\int_{1}^{e} \frac{x^2+1}{x} dx = ?$

A) 0 B) 1 C) e^2

D) $\frac{e^2+1}{2}$ E) 3

[KTÜ. YÖS 2013]

Yanıtlar / Answers

1. B	4. E	7. D	10. A	13. D
2. E	5. C	8. A	11. E	
3. C	6. C	9. D	12. B	

1.
$$\int_0^{\frac{\pi}{2}} \cos^3 t\,dt = \int_0^{\frac{\pi}{2}} \cos t\cdot\cos^2 t\,dt = \int_0^{\frac{\pi}{2}} \cos t(1-\sin^2 t)\,dt$$

$u=\sin t \Rightarrow du=\cos t\,dt$

$t=\frac{\pi}{2} \Rightarrow u=1$

$t=0 \Rightarrow u=0$

$$\int_0^{\frac{\pi}{2}} \cos t(1-\sin^2 t)\,dt=\int_0^{1}(1-u^2)\,du$$

$$=u-\frac{u^3}{3}\Big|_0^1=\left(1-\frac{1}{3}\right)-0=\frac{2}{3}$$

Yanıt / Answer B

2.
$$\int_0^{\frac{\pi}{12}} \sin^3 2x\cdot 2\sin 2x\cdot\cos 2x\,dx$$

$t=\sin 2x \Rightarrow dt=2\cos 2x\,dx$

$x=\frac{\pi}{12} \Rightarrow t=\frac{1}{2}$

$x=0 \Rightarrow t=0$

$$=2\int_0^{\frac{\pi}{12}} \sin^4 2x\cdot\cos 2x\,dx=2\cdot\frac{1}{2}\int_0^{\frac{1}{2}} t^4\,dt=\frac{t^5}{5}\Big|_0^{\frac{1}{2}}$$

$$=\frac{\left(\frac{1}{2}\right)^5}{5}-\frac{0}{5}=\frac{\frac{1}{2^5}}{5}=\frac{1}{160}$$

Yanıt / Answer E

3.
$$\int_1^2 \frac{2dx}{x^2-2x+1+1}=\int_1^2 \frac{2dx}{1+(x-1)^2}$$

$t=x-1 \Rightarrow dt=dx$

$x=2 \Rightarrow t=1$

$x=1 \Rightarrow t=0$

$$\int_1^2 \frac{2dx}{1+(x-1)^2}=2\int_0^1 \frac{dt}{1+t^2}=2\arctan t\Big|_0^1$$

$$=2(\arctan 1-\arctan 0)$$

$$=2\left(\frac{\pi}{4}-0\right)=\frac{\pi}{2}$$

Yanıt / Answer C

4.
$$\frac{2}{x^2+6x+8}=\frac{A}{x+2}+\frac{B}{x+4}$$

$2=x(A+B)+2A+4B$

$A+B=0$

$2A+4B=2 \Rightarrow A=-1,\ B=1$

$$\int_1^2 \frac{2dx}{x^2+6x+8}dx=\int_1^2\left(\frac{1}{x+2}-\frac{1}{x+4}\right)dx$$

$$=\ln|x+2|\,\Big|_1^2-\ln|x+4|\,\Big|_1^2$$

$$=\ln 4-\ln 3-(\ln 6-\ln 5)$$

$$=\ln\frac{4}{3}\cdot\frac{5}{6}=\ln\frac{10}{9}$$

Yanıt / Answer E

5.
$$\int_0^{\frac{\pi^2}{4}} \frac{\cos\sqrt{x}}{2\sqrt{x}}\,dx=\int_0^{\frac{\pi}{2}} \cos t\,dt$$

$t=\sqrt{x} \Rightarrow dt=\frac{1}{2\sqrt{x}}\,dx$

$t=\frac{\pi^2}{4} \Rightarrow t=\frac{\pi}{2}$

$t=0 \Rightarrow t=0$

$$\int_0^{\frac{\pi}{2}} \cos t\,dt=\sin t\Big|_0^{\frac{\pi}{2}}=\sin\frac{\pi}{2}-\sin 0=1-0=1$$

Yanıt / Answer C

6.
$$\int_1^{\sqrt{3}} \frac{x}{\sqrt{x^2+5}}\,dx$$

$t=x^2+5 \Rightarrow \frac{1}{2}dt=x\,dx$

$x=\sqrt{3} \Rightarrow t=8$

$x=1 \Rightarrow t=6$

$$=\frac{1}{2}\int_6^8 \frac{dt}{\sqrt{t}}=\frac{1}{2}\int_6^8 t^{-\frac{1}{2}}\,dt=\sqrt{t}\,\Big|_6^8$$

$$=\sqrt{8}-\sqrt{6}=\sqrt{2}\,(2-\sqrt{3})$$

Yanıt / Answer C

7. $\int_0^1 x^3(1-x^2)^6\,dx=\int_0^1 x\cdot x^2(1-x^2)^6\,dx$

$1-x^2=t \Rightarrow x\,dx=-\frac{1}{2}\,dt$

$x=1 \Rightarrow t=0$

$x=0 \Rightarrow t=1$

$$\int_0^1 x\cdot x^2(1-x^2)^6\,dx=-\int_0^1 (1-t)t^6\cdot\left(-\frac{1}{2}dt\right)$$

$$=\frac{1}{2}\int_0^1 (t^6-t^7)dt$$

$$=\frac{1}{2}\left(\frac{t^7}{7}-\frac{t^8}{8}\right)\Bigg|_0^1$$

$$=\frac{1}{2}\cdot\left(\frac{1}{7}-\frac{1}{8}\right)=\frac{1}{2}\cdot\frac{1}{56}=\frac{1}{112}$$

Yanıt / Answer D

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8. $\int_{\frac{\pi}{2}}^{\pi}\sqrt{2-2\cos4x}\,dx=\int_{\frac{\pi}{2}}^{\pi}\sqrt{2-2(1-2\sin^2 2x)}\,dx$

$$=\int_{\frac{\pi}{2}}^{\pi}\sqrt{2-2+4\sin^2 2x}\,dx=\int_{\frac{\pi}{2}}^{\pi}2(\sin2x)\,dx$$

$$=2\int_{\frac{\pi}{2}}^{\pi}\sin2x\,dx=-2\cdot\frac{1}{2}\cdot\cos2x\,\Bigg|_{\frac{\pi}{2}}^{\pi}$$

$$=-(\cos2\pi-\cos\pi)=-(1+1)=-2$$

Yanıt / Answer A

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9. $\int_0^{\frac{\pi}{2}}\cos^2x\,dx=\frac{1}{2}\int_0^{\frac{\pi}{2}}(1+\cos2x)\,dx$

$\cos2x=2\cos^2x-1$

$\cos^2x=\frac{1+\cos2x}{2}$

$$\int_0^{\frac{\pi}{2}}(1+\cos2x)\,dx=\frac{1}{2}\cdot\left(x+\frac{1}{2}\cdot\sin2x\right)\Bigg|_0^{\frac{\pi}{2}}$$

$$=\frac{1}{2}\cdot\left[\left(\frac{\pi}{2}+\frac{1}{2}\cdot\sin\pi\right)-\left(0+\frac{1}{2}\cdot\sin0\right)\right]$$

$$=\frac{1}{2}\cdot\left[\left(\frac{\pi}{2}+0\right)\right]=\frac{\pi}{4}$$

Yanıt / Answer D

10. $\int_0^2\frac{(2x+1)\,dx}{\sqrt{x^2+x+1}}$

$t=x^2+x+1 \Rightarrow dt=(2x+1)\,dt$

$x=2 \Rightarrow t=7$

$x=0 \Rightarrow t=1$

$$\int_1^7\frac{dt}{\sqrt{t}}=\int_1^7 t^{-\frac{1}{2}}\,dt=2t^{\frac{1}{2}}\Bigg|_0^7=2\sqrt{t}\,\Bigg|_1^7$$

$$=2\sqrt{7}-2\sqrt{1}=2\sqrt{7}-2=2(\sqrt{7}-1)$$

Yanıt / Answer A

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11. $\int_0^1 e^x\,dx+\int_1^e \ln x\,dx=e^x\,\Bigg|_0^1+x(\ln x-1)\,\Bigg|_1^e$

$$=e^1-e^0+e\cdot[(\ln e-1)-(\ln1-1)]$$

$$=e-1+e(1-1)+0+1$$

$$=e-1+0+0+1$$

$$=e$$

Yanıt / Answer E

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12. $\int_{e^2}^{e^{12}}\frac{dx}{x\cdot\ln x}$

$t=\ln x \Rightarrow dt=\frac{1}{x}\,dx$

$x=e^{12} \Rightarrow t=12$

$x=e^2 \Rightarrow t=2$

$$\int_2^{12}\frac{dt}{t}=\ln t\,\Bigg|_2^{12}=\ln12-\ln2=\ln\frac{12}{2}=\ln6$$

Yanıt / Answer B

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13. $\int_1^e\frac{x^2+1}{x}\,dx=\int_1^e x+\frac{1}{x}\,dx=\left(\frac{x^2}{2}+\ln x\right)\Bigg|_1^e$

$$=\left(\frac{e^2}{2}+\ln e\right)-\left(\frac{1}{2}+\ln1\right)$$

$$=\left(\frac{e^2}{2}+1\right)-\left(\frac{1}{2}+0\right)$$

$$=\frac{e^2}{2}+\frac{1}{2}=\frac{e^2+1}{2}$$

Yanıt / Answer D

1. $\int_{0}^{3} |x-2|\,dx = ?$

A) $-\frac{3}{2}$

B) $-\frac{1}{2}$

C) $\frac{1}{2}$

D) $\frac{3}{2}$

E) $\frac{5}{2}$

2. $\int_{-1}^{1} |x|\,dx = ?$

A) 5

B) 4

C) 3

D) 2

E) 1

3. $\int_{1}^{3} |x-2|\,dx = ?$

A) –4

B) –2

C) 1

D) 3

E) 4

4. $\int_{-1}^{1} |x^2 - x|\,dx = ?$

A) $\frac{5}{6}$

B) $\frac{2}{3}$

C) $\frac{1}{2}$

D) $\frac{1}{3}$

E) 1

5. $\int_{-1}^{2} (|x-2| + |x+1|)\,dx = ?$

A) 6

B) 8

C) 9

D) 10

E) 12

6. $\int_{-2}^{0} \sqrt{x^2 + 2x + 1}\,dx = ?$

A) -1

B) $-\frac{1}{2}$

C) 0

D) $\frac{1}{2}$

E) 1

7. $\int_0^{2\pi}\left(\frac{\cos x+|\cos x|}{2}\right)dx=?$

A) 0

B) $\frac{1}{2}$

C) 1

D) $\frac{3}{2}$

E) 2

8. $\int_{-2}^{2}|x^2-4|\,dx=?$

A) $\frac{32}{3}$

B) $\frac{16}{3}$

C) $\frac{8}{3}$

D) $\frac{4}{3}$

E) $\frac{1}{3}$

9. $\int_0^{\pi}|\cos x|\,dx=?$

A) 6

B) 4

C) 2

D) 1

E) 0

10. $\int_{-1}^{3}\left|x^2-2x-3\right|dx=?$

A) $\frac{27}{2}$

B) $\frac{32}{3}$

C) 12

D) 15

E) $\frac{49}{2}$

11. $\int_{-1}^{2}6\cdot x|x-1|\,dx=?$

A) 1

B) 2

C) 4

D) 6

E) 10

12. $\int_1^7\frac{dx}{x^2+7x}=?$

A) $-\frac{4}{7}\ln 2$

B) $\frac{1}{7}\ln 2$

C) $\frac{2}{7}\ln 2$

D) $\frac{3}{7}\ln 2$

E) $\frac{7}{3}\ln 2$

[AKDENİZ ÜNV. YÖS 2013]

Yanıtlar (Answers)

1. E	4. E	7. E	10. B
2. E	5. C	8. A	11. A
3. C	6. E	9. C	12. C

1.

$x-2=0$

$\Rightarrow x=2$

x	0		2		3
x − 2		−	○	+	

$$\int_0^3 |x-2|\,dx=\int_0^2 (2-x)\,dx+\int_2^3 (x-2)\,dx$$

$$=\left(2x-\frac{x^2}{2}\right)\Big|_0^2+\left(\frac{x^2}{2}-2x\right)\Big|_2^3$$

$$=\left(4-\frac{4}{2}\right)-0+\left(\frac{9}{2}-6\right)-\left(\frac{4}{2}-4\right)$$

$$=2-\frac{3}{2}+2=4-\frac{3}{2}=\frac{5}{2}$$

Yanıt / Answer E

2.

$x=0$

x	−1		0		1
x		−	○	+	

$$\int_{-1}^1 |x|\,dx=\int_{-1}^0 -x\,dx+\int_0^1 x\,dx$$

$$=-\frac{x^2}{2}\Big|_{-1}^0+\frac{x^2}{2}\Big|_0^1$$

$$=0-\left(-\frac{1}{2}\right)+\frac{1}{2}-0=\frac{1}{2}+\frac{1}{2}=1$$

Yanıt / Answer E

3.

$x-2=0$

$\Rightarrow x=2$

x	1		2		3
x − 2		−	○	+	

$$\int_1^3 |x-2|\,dx=\int_1^2 (2-x)\,dx+\int_2^3 (x-2)\,dx$$

$$=\left(2x-\frac{x^2}{2}\right)\Big|_1^2+\left(\frac{x^2}{2}-2x\right)\Big|_2^3$$

$$=\left(4-\frac{4}{2}\right)-\left(2-\frac{1}{2}\right)+\left(\frac{9}{2}-6\right)-\left(\frac{4}{2}-4\right)$$

$$=2-\frac{3}{2}-\frac{3}{2}+2=4-3=1$$

Yanıt / Answer C

4.

$x^2-x=0\Rightarrow x=0 \vee x=1$

x	−1		0		1	
x² − x		+	○	−	○	+

$$\int_{-1}^1 \left|x^2-x\right|dx=\int_{-1}^0 (x^2-x)+\int_0^1 (x-x^2)\,dx$$

$$=\left(\frac{x^3}{3}-\frac{x^2}{2}\right)\Big|_{-1}^0+\left(\frac{x^2}{2}-\frac{x^3}{3}\right)\Big|_0^1$$

$$=0-\left(-\frac{1}{3}-\frac{1}{2}\right)+\left(\frac{1}{2}-\frac{1}{3}\right)-0$$

$$=-\left(-\frac{5}{6}\right)+\left(\frac{1}{6}\right)=\frac{5}{6}+\frac{1}{6}=\frac{6}{6}=1$$

Yanıt / Answer E

5.

$x-2=0\Rightarrow x=2$

$x+1=0\Rightarrow x=-1$

x		−1		2	
x − 2	−		−	○	+
x + 1	−	○	+		+

$$\int_{-1}^2 \left(|x-2|+|x+1|\right)dx=\int_{-1}^2 \left((2-x)+(x+1)\right)dx$$

$$=\int_{-1}^2 3\,dx=3x\Big|_{-1}^2$$

$$=(3\cdot 2)-(3(-1))$$

$$=6+3=9$$

Yanıt / Answer C

6.

$x+1=0$

$\Rightarrow x=-1$

x	−2		−1		0
x + 1		−	○	+	○

$$\int_{-2}^0 \sqrt{x^2+2x+1}\,dx=\int_{-2}^0 \sqrt{(x+1)^2}\,dx=\int_{-2}^0 |x+1|\,dx$$

$$=\int_{-2}^{-1} (-x-1)\,dx+\int_{-1}^0 (x+1)\,dx$$

$$=\left(-\frac{x^2}{2}-x\right)\Big|_{-2}^{-1}+\left(\frac{x^2}{2}+x\right)\Big|_{-1}^0$$

$$=\left(-\frac{1}{2}+1\right)-\left(-\frac{4}{2}+2\right)+\left(\frac{0}{2}+0\right)-\left(\frac{1}{2}-1\right)$$

$$=\frac{1}{2}-0+0+\frac{1}{2}=\frac{1}{2}+\frac{1}{2}=1$$

Yanıt / Answer E

7.

$$\begin{array}{c|ccccccccc} x & 0 & & \frac{\pi}{2} & & \pi & & \frac{3\pi}{2} & & 2\pi \\ \hline \cos x & & + & \circ & - & \circ & - & \circ & + & \circ \end{array}$$

$$\int_0^{2\pi}\left(\frac{\cos x+|\cos x|}{2}\right)dx$$

$$=\int_0^{\frac{\pi}{2}}\cos x\,dx+\int_{\frac{\pi}{2}}^{\pi}0\,dx+\int_{\pi}^{\frac{3\pi}{2}}0+\int_{\frac{3\pi}{2}}^{2\pi}\cos x\,dx$$

$$=\sin x\Big|_0^{\frac{\pi}{2}}+\sin x\Big|_{\frac{3\pi}{2}}^{2\pi}$$

$$=\sin\frac{\pi}{2}+\sin 0+\sin 2\pi-\underbrace{\sin\frac{3\pi}{2}}_{-1}$$

$$=1+0+0+1=2$$

Yanıt / Answer E

8.

$x^2-4=0$

$\Rightarrow x=\pm 2$

$$\begin{array}{c|ccccc} x & & -2 & & 2 & \\ \hline x^2-4 & + & \circ & - & \circ & + \end{array}$$

$$\int_{-2}^{2}|x^2-4|\,dx=\int_{-2}^{2}(4-x^2)\,dx=\left(4x-\frac{x^3}{3}\right)\Big|_{-2}^{2}$$

$$=\left(8-\frac{8}{3}\right)-\left(-8+\frac{8}{3}\right)$$

$$=\frac{16}{3}-\left(-\frac{16}{3}\right)=\frac{16}{3}+\frac{16}{3}=\frac{32}{3}$$

Yanıt / Answer A

9.

$$\begin{array}{c|ccccc} x & 0 & & \frac{\pi}{2} & & \pi \\ \hline \cos x & \circ & + & \circ & - & \circ \end{array}$$

$$\int_0^{\pi}|\cos x|\,dx=\int_0^{\frac{\pi}{2}}\cos x\,dx-\int_{\frac{\pi}{2}}^{\pi}\cos x\,dx$$

$$=\sin x\Big|_0^{\frac{\pi}{2}}-\sin x\Big|_{\frac{\pi}{2}}^{\pi}$$

$$=\sin\frac{\pi}{2}-\sin 0-\sin\pi+\sin\frac{\pi}{2}$$

$$=1-0-0+1=2$$

Yanıt / Answer C

10.

$$\begin{array}{c|ccccc} x & & -1 & & 3 & \\ \hline x^2-2x-3 & + & \circ & - & \circ & + \end{array}$$

$$\int_{-1}^{3}|x^2-2x-3|\,dx=\int_{-1}^{3}(-x^2+2x+3)\,dx$$

$$=\left(-\frac{x^3}{3}+x^2+3x\right)\Big|_{-1}^{3}$$

$$=\left(-\frac{27}{3}+9+9\right)-\left(\frac{1}{3}+1-3\right)$$

$$=(-9+9+9)-\left(\frac{1}{3}-2\right)$$

$$=9-\left(-\frac{5}{3}\right)=9+\frac{5}{3}=\frac{32}{3}$$

Yanıt / Answer B

11.

$$\begin{array}{c|ccc} x & -1 & 1 & 2 \\ \hline x-1 & - & \circ & + \end{array}$$

$$\int_{-1}^{2}6x|x-1|\,dx=\int_{-1}^{1}6x(1-x)+\int_{1}^{2}6x(x-1)\,dx$$

$$=6\int_{-1}^{1}(x-x^2)+6\int_{1}^{2}(x^2-x)\,dx$$

$$=6\left(\frac{x^2}{2}-\frac{x^3}{3}\right)\Big|_{-1}^{1}+6\left(\frac{x^3}{3}-\frac{x^2}{2}\right)\Big|_{1}^{2}$$

$$=6\left[\left(\frac{1}{2}-\frac{1}{3}\right)-\left(\frac{1}{2}+\frac{1}{3}\right)\right]+6\left[\left(\frac{8}{3}-\frac{4}{2}\right)-\left(\frac{1}{3}-\frac{1}{2}\right)\right]$$

$$=6\left[\frac{1}{6}-\frac{5}{6}\right]+6\left[\left(\frac{2}{3}\right)-\left(-\frac{1}{6}\right)\right]$$

$$=1-5+4+1=1$$

Yanıt / Answer A

12.

$$\underset{(1)}{\frac{1}{x(x+7)}}=\underset{(x+7)}{\frac{A}{x}}+\underset{(x)}{\frac{B}{x+7}}$$

$1=(A+B)x+7A$

$A+B=0$

$7A=1$

$A=\frac{1}{7}$,

$B=-\frac{1}{7}$

$$\frac{1}{7}\int_1^7\left(\frac{1}{x}+\frac{-1}{x+7}\right)dx$$

$$=\frac{1}{7}\ln|x|-\ln|x+7|$$

$$=\frac{1}{7}\left|\frac{x}{x+7}\right|\Big|_1^7$$

$$=\frac{1}{7}\left[\ln\frac{1}{2}-\ln\frac{1}{8}\right]$$

$$=\frac{1}{7}\ln 4=\frac{2}{7}\ln 2$$

Yanıt / Answer C

1. $\frac{d^2}{dx^2}\left(\int_1^{x^2}(t^2+t)\cdot dt\right)=?$

A) $5x^4+3x^2$

B) $10x^4+3x^2$

C) $10x^4+6x^2$

D) $12x^4+6x^2$

E) x^4+6x^2

2. $F(x)=\int_{3x}^{4x+1}\frac{\sin\frac{\pi}{3}t}{t}dt \Rightarrow F'(1)=?$

A) $-\frac{\sqrt{3}}{5}$ B) $\frac{-2\sqrt{3}}{5}$ C) 0

D) $\frac{2\sqrt{3}}{5}$ E) $\frac{\sqrt{3}}{10}$

3. $\int_2^x \ln t\, dt=F(x) \Rightarrow F'(e^3)=?$

A) $\frac{1}{3}$ B) $\frac{1}{2}$ C) 1 D) 2 E) 3

4. $f(x)=\int_1^{\ln x^3} e^t dt \Rightarrow f'(e)=?$

A) $\frac{3}{e}$ B) $\frac{3}{e^2}$ C) $\frac{1}{e^2}$ D) e^2 E) $3e^2$

5. $\int_{\frac{\sqrt{3}}{2}}^{\frac{3}{2}}\frac{dx}{9+4x^2}=?$

A) $\frac{9}{2}$ B) $\frac{\pi}{12}$ C) $\frac{\pi}{36}$ D) $\frac{\pi}{72}$ E) 4

6. $\sqrt{x}+\sqrt{y}-1=0 \Rightarrow \int_0^1 y\, dx=?$

A) $\frac{2}{3}$ B) $\frac{3}{2}$ C) $\frac{3}{8}$ D) $\frac{1}{6}$ E) 16

7. $\int_0^1 ax^2 dx=2 \Rightarrow a=?$

A) 6 B) 7 C) 8 D) 9 E) 12

8. $F(x)=\int_{\cos x}^{\sin x} u\,du \Rightarrow F'(\frac{\pi}{4})=?$

A) -1 B) 0 C) 1 D) 2 E) 4

9. $\int_{1}^{e} \frac{\ln x}{x^2}\,dx=?$

A) $\frac{e-2}{e}$ B) $-\frac{2+e}{e}$ C) $\frac{2-e}{e}$ D) $\frac{e}{1-2e}$ E) $\frac{1-2e}{e}$

10. $\frac{d}{dx}\int_{0}^{\ln x^2} f(t)dt=2 \Rightarrow f(x)=?$

A) e^{-2x} B) $2e^{-x}$ C) e^{x} D) $\sqrt{e^{x}}$ E) $2\cdot\sqrt{e^{x}}$

11. $y=\sqrt{9-x^2} \Rightarrow \int_{0}^{3} y^2 dx=?$

A) 6 B) 12 C) 18 D) 27 E) 81

12. $\int_{0}^{1} \frac{dx}{\sqrt{4-x^2}}=?$

A) $\frac{\pi}{3}$ B) $\frac{\pi}{6}$ C) $\frac{\pi}{4}$ D) $\frac{3\pi}{2}$ E) $\frac{\pi}{2}$

13. $f(x)=\int_{x}^{2x} \frac{t^3}{t^4+4}\,dt \Rightarrow f'(1)=?$

A) $\frac{2}{3}$ B) $\frac{2}{5}$ C) $\frac{3}{7}$ D) $\frac{1}{3}$ E) $\frac{3}{5}$

14. $\int_{0}^{2} \sqrt{4-x^2}\,dx=?$

A) $\frac{\pi}{4}$ B) $\frac{\pi}{2}$ C) $\frac{\pi}{3}$ D) π E) 2π

Yanıtlar / Answers

1. C	4. E	7. A	10. D	13. E
2. B	5. D	8. C	11. C	14. D
3. E	6. A	9. A	12. B	

1. $$\frac{d^2}{dx^2}\left(\int_1^{x^2}(t^2+t)\,dt\right)=\frac{d}{dx}\left[\frac{d}{dx}\int_1^{x^2}(t^2+t)\,dt\right]$$

$$=\frac{d}{dx}\left[(x^4+x^2)\cdot 2x\right]$$

$$=\frac{d}{dx}(2x^5+2x^3)$$

$$=10x^4+6x^2$$

Yanıt / Answer C

---

2. $$F(x)=\int_{3x}^{4x+1}\frac{\sin\frac{\pi}{3}t}{t}$$

$$\Rightarrow F'(x)=4\cdot\frac{\sin\left(\frac{4x+1}{3}\right)\pi}{4x+1}-3\cdot\frac{\sin\frac{3x\pi}{3}}{3x}$$

$$F'(1)=4\cdot\frac{\sin\frac{5\pi}{3}}{4+1}-3\cdot\frac{\sin\pi}{3}$$

$$=\frac{4}{5}\cdot\sin\left(\pi+\frac{2\pi}{3}\right)-0=-\frac{4}{5}\cdot\sin\frac{2\pi}{3}$$

$$=-\frac{4}{5}\cdot\frac{\sqrt{3}}{2}=-\frac{2\sqrt{3}}{5}$$

Yanıt / Answer B

---

3. $$F(x)=\int_2^x \ln t\,dt \Rightarrow F'(x)=\ln x\cdot 1-0$$

$$F'(e^3)=\ln e^3=3\ln e=3$$

Yanıt / Answer E

---

4. $$f(x)=\int_1^{\ln x^3}e^t\,dt \Rightarrow f'(x)=e^{\ln x^3}\cdot\frac{3}{x}-0$$

$$f'(e)=e^{3\ln e}\cdot\frac{3}{e}=e^3\cdot\frac{3}{e}=3e^2$$

Yanıt / Answer E

---

5. $$\int_{\frac{\sqrt{3}}{2}}^{\frac{3}{2}}\frac{dx}{9+4x^2}=\frac{1}{9}\int_{\frac{\sqrt{3}}{2}}^{\frac{3}{2}}\frac{dx}{1+\left(\frac{2x}{3}\right)^2}$$

$$t=\frac{2x}{3}\Rightarrow\frac{3}{2}dt=dx$$

$$=\frac{1}{6}\int_{\frac{\sqrt{3}}{2}}^{\frac{3}{2}}\frac{dt}{1+t^2}=\frac{1}{6}\cdot\left(\arctan\left(\frac{2x}{3}\right)\right)\Bigg|_{\frac{\sqrt{3}}{2}}^{\frac{3}{2}}$$

$$=\frac{1}{6}\cdot\left(\arctan 1-\arctan\frac{\sqrt{3}}{3}\right)$$

$$=\frac{1}{6}\cdot\left(\frac{\pi}{4}-\frac{\pi}{6}\right)$$

$$=\frac{1}{6}\cdot\left(\frac{3\pi-2\pi}{12}\right)=\frac{\pi}{72}$$

Yanıt / Answer D

---

6. $$\sqrt{x}+\sqrt{y}=1\Rightarrow\sqrt{y}=1-\sqrt{x}$$

$$y=(1-\sqrt{x})^2\Rightarrow y=1+x-2\sqrt{x}$$

$$\int_0^1 y\,dx=\int_0^1\left(1+x-2x^{\frac{1}{2}}\right)dx=\left(x+\frac{x^2}{2}-2\cdot\frac{x^{\frac{3}{2}}}{\frac{3}{2}}\right)\Bigg|_0^1$$

$$=\left(x+\frac{x^2}{2}-\frac{4x\sqrt{x}}{3}\right)\Bigg|_0^1$$

$$=\left(1+1-\frac{4\cdot\sqrt{1}}{3}\right)=2-\frac{4}{3}=\frac{2}{3}$$

Yanıt / Answer A

---

7. $$\int_0^1 a\cdot x^2\,dx=2\Rightarrow$$

$$a\cdot\frac{x^3}{3}\Bigg|_0^1=2\Rightarrow a\cdot\frac{1}{3}-0=2\Rightarrow\frac{a}{3}=2\Rightarrow a=6$$

Yanıt / Answer A

8. $$F(x)=\int_{\cos x}^{\sin x} u\ du \Rightarrow$$

$$F'(x)=\sin x\cdot\cos x+\cos x\cdot\sin x$$

$$=2\sin x\cdot\cos x=\sin 2x$$

$$F'\left(\frac{\pi}{4}\right)=\sin\left(2\cdot\frac{\pi}{4}\right)=\sin\frac{\pi}{2}=1$$

Yanıt / Answer C

---

9. $$\int_1^e \frac{\ln x}{x^2}\,dx = -\frac{1}{x}\cdot\ln x\Big|_1^e+\int_1^e\frac{1}{x^2}\,dx$$

$u=\ln x$ $\quad\frac{1}{x^2}\,dx=dv$

$du=\frac{1}{x}\,dx$ $\quad-\frac{1}{x}=v$

$$-\frac{1}{x}\cdot\ln x\Big|_1^e+\int_1^e\frac{1}{x^2}\,dx=\left(-\frac{1}{x}\cdot\ln x-\frac{1}{x}\right)\Big|_1^e$$

$$=\left(-\frac{1}{e}\cdot\ln e-\frac{1}{e}\right)-(-1\ln 1-1)$$

$$=\left(-\frac{1}{e}-\frac{1}{e}\right)+1=\frac{-2}{e}+1=\frac{e-2}{e}$$

Yanıt / Answer A

---

10. $$\frac{d}{dx}\int_e^{\ln x^2} f(t)\,dx=2 \Rightarrow f(\ln x^2)\cdot\frac{2}{x}=2$$

$$f(2\ln x)=x$$

$$f(x)=e^{\frac{x}{2}}=\sqrt{e^x}$$

Yanıt / Answer D

---

11. $$\int_0^3(9-x^2)\,dx=9x-\frac{x^3}{3}\Big|_0^3=\left(27-\frac{27}{3}\right)-0$$

$$=27-9=18$$

Yanıt / Answer C

---

12. $$\underbrace{\int_0^1\frac{dx}{\sqrt{4-x^2}}}_{\Downarrow}=\int_0^1\frac{dx}{\sqrt{4\left(1-\frac{x^2}{4}\right)}}=\frac{1}{2}\int_0^1\frac{dx}{\sqrt{1-\left(\frac{x}{2}\right)^2}}$$

$t=\frac{x}{2} \Rightarrow 2\,dt=dx$

$x=1 \Rightarrow t=\frac{1}{2}$

$x=0 \Rightarrow t=0$

$$\frac{1}{2}\int_0^1\frac{dx}{\sqrt{1-\left(\frac{x}{2}\right)^2}}=\int_0^{\frac{1}{2}}\frac{dt}{\sqrt{1-t^2}}=\arcsin x\Big|_0^{\frac{1}{2}}$$

$$=\left(\arcsin\frac{1}{2}-\arcsin 0\right)=\left(\frac{\pi}{6}-0\right)=\frac{\pi}{6}$$

Yanıt / Answer B

---

13. $$f(x)=\int_x^{2x}\frac{t^3}{t^4+4} \Rightarrow$$

$$f'(x)=\frac{(2x)^3}{(2x)^4+4}\cdot 2-\frac{x^3}{x^4+4}\cdot 1$$

$$f'(1)=\frac{(2)^3}{(2)^4+4}-\frac{1}{1+4}$$

$$=\frac{8\cdot 2}{20}-\frac{1}{5}=\frac{4}{5}-\frac{1}{5}=\frac{3}{5}$$

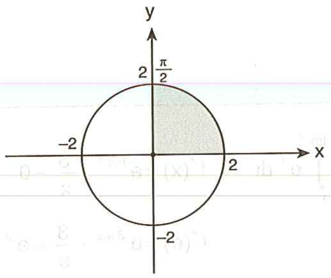
Yanıt / Answer E

---

14. $$\int_0^2\sqrt{4-x^2}\,dx$$

$x=2 \Rightarrow \sin\alpha=1 \Rightarrow \alpha=\frac{\pi}{2}$

$x=0 \Rightarrow \sin\alpha=0 \Rightarrow \alpha=0$

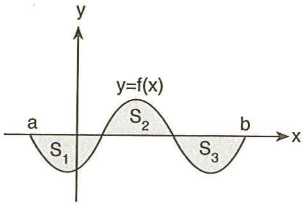


$$\int_0^2\sqrt{4-x^2}\,dx=\frac{2^2\cdot\pi}{4}=\pi$$

Yanıt / Answer D

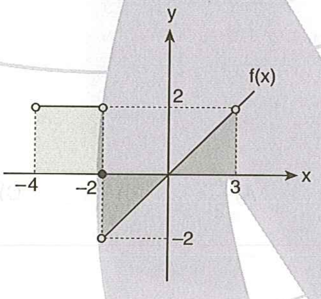
1. $S_1 = 7\ cm^2$,
$S_2 = 13\ cm^2$,
$S_3 = 9\ cm^2$

$\Rightarrow \int_a^b f(x)dx = ?$



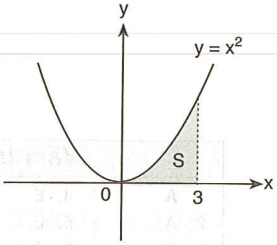
A) –3 B) –2 C) 0 D) 2 E) 3

2. $\int_{-4}^{3} f(x) \cdot dx = ?$



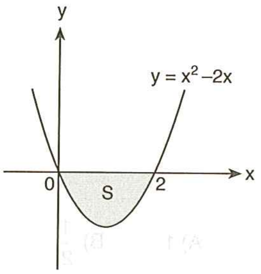
A) 5 B) 6 C) 7 D) 8 E) 9

3. **S = ? $br^2(u^2)$**



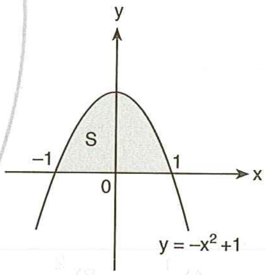
A) 6 B) 9 C) 18 D) 27 E) 36

4. **S = ? $br^2(u^2)$**



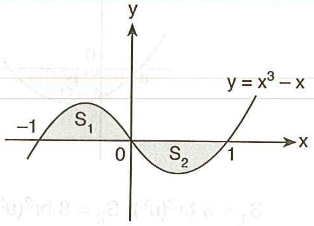
A) $-\frac{4}{3}$ B) $-\frac{8}{3}$ C) $\frac{10}{3}$ D) $\frac{8}{3}$ E) $\frac{4}{3}$

5. **S = ? $br^2(u^2)$**



A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{2}{3}$ D) 1 E) $\frac{4}{3}$

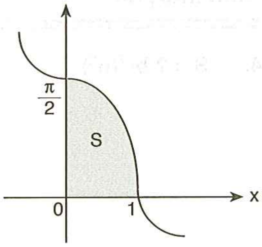
6. **$S_1 + S_2$ = ? $br^2(u^2)$**



A) $\frac{1}{2}$ B) 1 C) $\frac{3}{2}$ D) 2 E) $\frac{5}{2}$

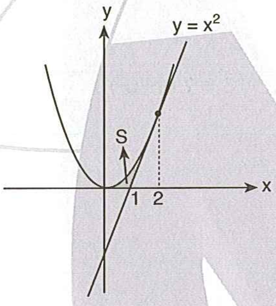
7. $f(x) = \arccos x$

$\Rightarrow$ **$S = ?$ br^2(u^2)**


y
$\frac{\pi}{2}$
S
0
1
x

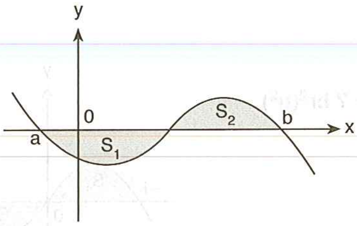
A) 1 B) $\frac{1}{2}$ C) 2 D) $\frac{2}{3}$ E) 3

8. **$S = ?$ br^2(u^2)**



A) $\frac{1}{3}$ B) $\frac{2}{3}$ C) 1 D) $\frac{4}{3}$ E) $\frac{5}{3}$

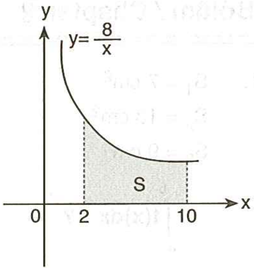
9.



$S_1 = 3$ br^2(u^2), $S_2 = 8$ br^2(u^2) $\Rightarrow \int_a^b f(x)dx = ?$

A) –5 B) –3 C) 3 D) 5 E) 11

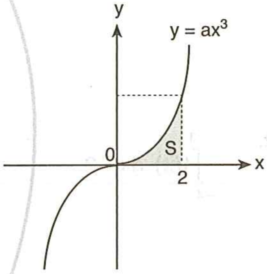
10. **$S = ?$ br^2(u^2)**


y
$y = \frac{8}{x}$
S
0
2
10
x

A) ln5 B) 2ln5 C) 4ln5 D) 6ln5 E) 8ln5

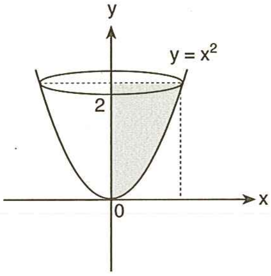
11. $S = 18$ br^2(u^2)

$\Rightarrow$ **$a = ?$**



A) $\frac{7}{2}$ B) $\frac{9}{2}$ C) 7 D) 9 E) 12

12. **$V = ?$ br^3(u^3)**

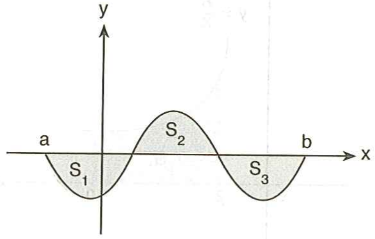


A) π B) 2π C) 4π D) 6π E) 8π

Yanıtlar (Answers)

1. A	4. E	7. B	10. E
2. A	5. E	8. B	11. B
3. B	6. A	9. D	12. B

1.



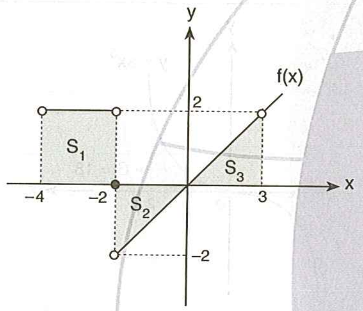
$$\int_a^b f(x)\,dx = -S_1 + S_2 - S_3$$

$$= -7 + 13 - 9$$

$$= -16 + 13 = -3$$

Yanıt / Answer A

2.



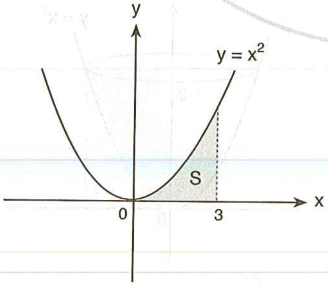
$$\int_{-4}^{3} f(x)\,dx = \int_{-4}^{-2} f(x)\,dx - \int_{-2}^{0} f(x)\,dx + \int_{0}^{3} f(x)\,dx$$

$$= 2(4-2) - \left(\frac{2\cdot 2}{2}\right) + \left(\frac{3\cdot 2}{2}\right)$$

$$= 4 - 2 + 3 = 7 - 2 = 5$$

Yanıt / Answer A

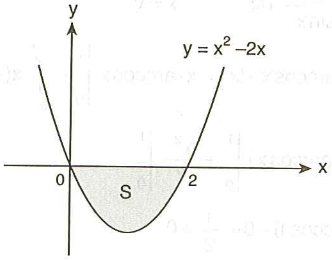
3.



$$S = \int_0^3 x^2\,dx = \left.\frac{x^3}{3}\right|_0^3 = \frac{3^3}{3} - \frac{0}{3} = \frac{27}{3} = 9 \text{ cm}^2$$

Yanıt / Answer B

4.

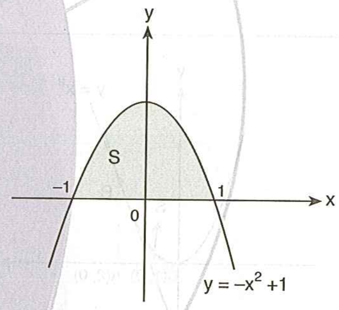


$$S = -\int_0^2 (x^2 - 2x)\,dx = \int_0^2 (2x - x^2)\,dx$$

$$= \left(2\frac{x^{1+1}}{1+1} - \frac{x^{2+1}}{2+1}\right)\Bigg|_0^2 = \left(x^2 - \frac{x^3}{3}\right)\Bigg|_0^2 = \left(4 - \frac{8}{3}\right) - 0 = \frac{4}{3} \text{ cm}^2$$

Yanıt / Answer E

5.

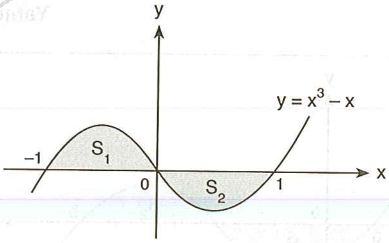


$$S = \int_{-1}^{1} (1 - x^2)\,dx = \left(x - \frac{x^{2+1}}{2+1}\right)\Bigg|_{-1}^{1} = \left(x - \frac{x^3}{3}\right)\Bigg|_{-1}^{1}$$

$$= \left(1 - \frac{1}{3}\right) - \left(-1 + \frac{1}{3}\right) = \frac{2}{3} - \left(-\frac{2}{3}\right) = \frac{2}{3} + \frac{2}{3} = \frac{4}{3} \text{ br}^2 (\text{u}^2)$$

Yanıt / Answer E

6.



$$S_1 = \int_{-1}^{0} (x^3 - x)\,dx = \left(\frac{x^4}{4} - \frac{x^2}{2}\right)\Bigg|_{-1}^{0} = 0 - \left(\frac{1}{4} - \frac{1}{2}\right) = \frac{1}{4}$$

$$S_2 = \int_{0}^{1} (x - x^3)\,dx = \left(\frac{x^2}{2} - \frac{x^4}{4}\right)\Bigg|_{0}^{1} = \left(\frac{1}{2} - \frac{1}{4}\right) - 0 = \frac{1}{4}$$

$$S_1 + S_2 = \frac{1}{4} + \frac{1}{4} = \frac{1}{2} \text{ br}^2 (\text{u}^2)$$

Yanıt / Answer A

7. $u = \arccos x \qquad dx = dv$

$du = \dfrac{-\sin x}{\sin x}\,dx \qquad x = v$

$$S = \int_0^1 \arccos x\,dx = x \cdot \arccos x \Big|_0^1 - \int_0^1 x(-dx)$$

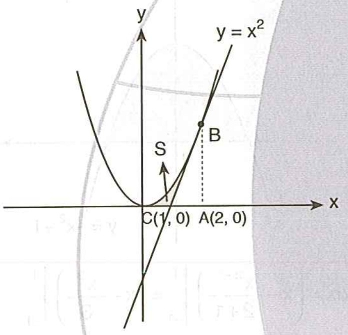
$$= (x \cdot \arccos x)\Big|_0^1 + \frac{x^2}{2}\Big|_0^1$$

$$= (\arccos 1) - 0 + \frac{1}{2} + 0$$

$$= 0 + \frac{1}{2} = \frac{1}{2}\ \text{cm}^2$$

Yanıt / Answer B

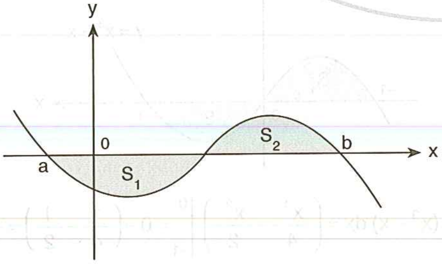
8.



$$S = \int_1^2 x^2\,dx - A(\overset{\Delta}{CBA}) = \frac{x^3}{3}\Big|_0^2 - \frac{1 \cdot 4}{2} = \frac{8}{3} - 2 = \frac{8-6}{3} = \frac{2}{3}$$

Yanıt / Answer B

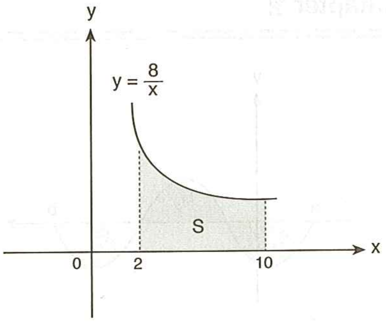
9.



$$\int_a^b f(x)\,dx = -S_1 + S_2 = -3 + 8 = 5$$

Yanıt / Answer D

10.

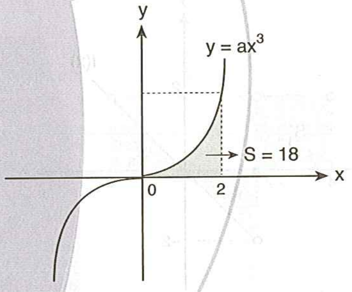


$$S = \int_2^{10} \frac{8}{x}\,dx = 8\ln x \Big|_2^{10}$$

$$= 8\ln 10 - 8\ln 2 = 8(\ln 10 - \ln 2) = 8\ln\frac{10}{2} = 8\ln 5$$

Yanıt / Answer E

11.

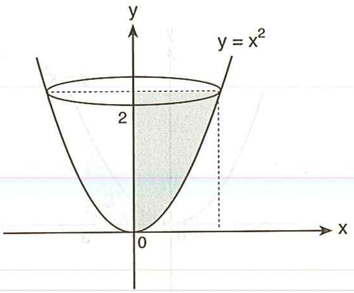


$$S = 18 = \int_0^2 ax^3\,dx \Rightarrow$$

$$18 = a \cdot \frac{x^4}{4}\Big|_0^2 = a \cdot \frac{16}{4} - 0 \Rightarrow 18 = 4a \Rightarrow a = \frac{9}{2}$$

Yanıt / Answer B

12.



$y = x^2 \Rightarrow x = \sqrt{y}$

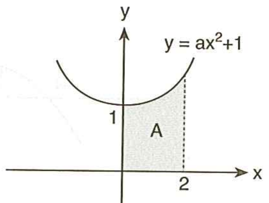
$$V = \pi \int_0^2 x^2\,dy = \pi \int_0^2 y\,dy$$

$$= \pi \cdot \frac{y^2}{2}\Big|_0^2 = \pi\frac{4}{2} - 0 = 2\pi$$

Yanıt / Answer B

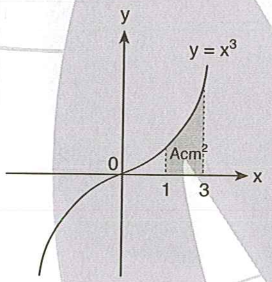
1. $A = 4\ \text{cm}^2$

$\Rightarrow$ **a = ?**


y
y = ax^2+1
1
A
2
x

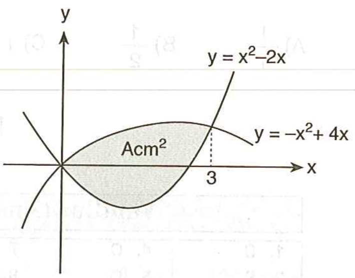
A) $\frac{1}{2}$ B) $\frac{1}{4}$ C) $\frac{3}{4}$ D) $\frac{4}{3}$ E) 2

2. **A = ?**


y
y = x^3
0
Acm^2
1
3
x

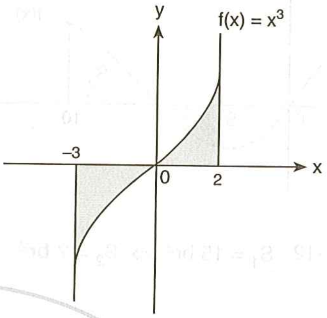
A) 12 B) 14 C) 16 D) 18 E) 20

3. **A = ?**


y
y = x^2–2x
y = –x^2+ 4x
Acm^2
3
x

A) 6 B) 7 C) 8 D) 9 E) 10

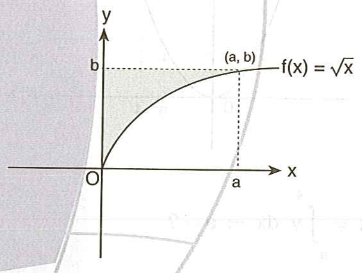
4.



Taralı alan / Shaded area = ?

A) 25 B) 24 C) $\frac{97}{4}$ D) $\frac{107}{4}$ E) $\frac{117}{5}$

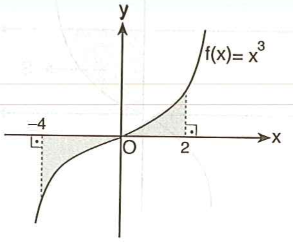
5.


y
b
(a, b)
f(x) = $\sqrt{x}$
O
a
x

Taralı alan / Shaded area = 9 br^2 (u^2) $\Rightarrow$ **a = ?**

A) 3 B) 6 C) 8 D) 9 E) 16

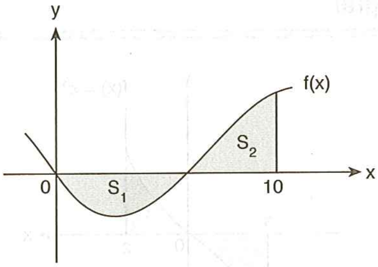
6.



Taralı alan (Shaded area) = ?

A) 54 B) 62 C) 68 D) 72 E) 84

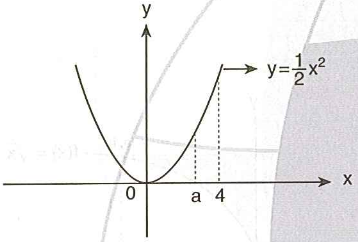
7.


y
f(x)
S_2
x
0
S_1
10

$$\int_0^{10} f(x)\ dx = -12 \quad S_1 = 15\ br^2 \Rightarrow \mathbf{S_2 = ?\ br^2}$$

A) 3 B) 4 C) 7 D) 12 E) 21

8.

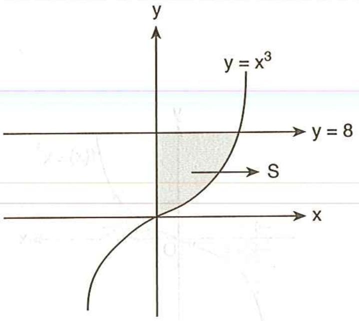

y
$y=\frac{1}{2}x^2$
x
0
a
4

$$2\int_0^a y\ dx = \int_a^4 y\ dx \Rightarrow \mathbf{a = ?}$$

A) $\frac{4\sqrt{3}}{3}$ B) $\frac{4\cdot\sqrt[3]{9}}{3}$ C) $\frac{8\sqrt{3}}{3}$

D) $4\sqrt{3}$ E) $4\sqrt{2}$

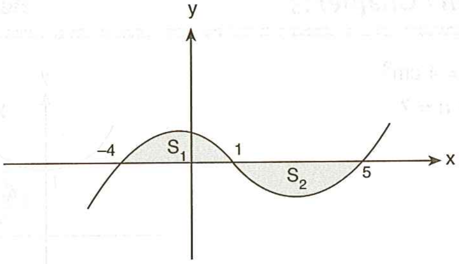
9.



S = ?

A) 8 B) 10 C) 12 D) 14 E) 16

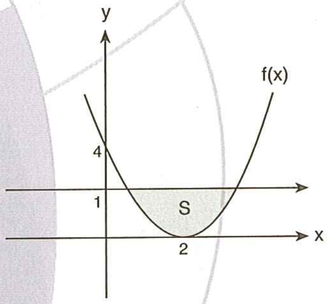
10.



$$\int_{-4}^{1} f(x)\ dx = 5\ ,\quad \int_1^5 f(x)\ dx = -4 \quad \Rightarrow \mathbf{S_1 + S_2 = ?}$$

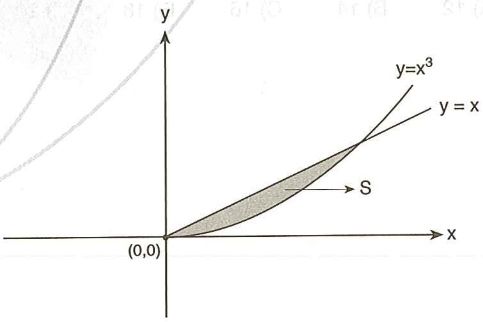
A) 6 B) 7 C) 8 D) 9 E) 10

11.



A) $\frac{1}{3}$ B) $\frac{2}{3}$ C) 1 D) $\frac{4}{3}$ E) $\frac{5}{3}$

12.


y
$y=x^3$
$y = x$
S
x
(0,0)

S = ? br² (unit square)

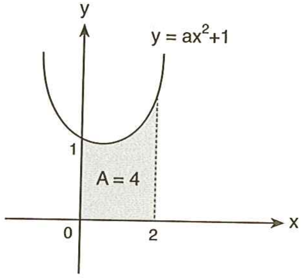
A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) 1 D) $\frac{3}{2}$ E) 2

[AKDENİZ ÜNV. YÖS 2013]

Yanıtlar (Answers)

1. C	4. C	7. A	10. D
2. E	5. D	8. B	11. D
3. D	6. C	9. C	12. A

1.



$$4=\int_0^2 (ax^2+1)\,dx=\left(a\cdot\frac{x^3}{3}+x\right)\Big|_0^2$$

$$4=\left(a\cdot\frac{8}{3}+2\right)-(a\cdot 0+0)$$

$$2=\frac{8a}{3}\ \Rightarrow\ a=\frac{6}{8}=\frac{3}{4}$$

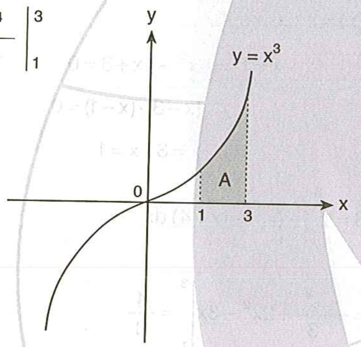
Yanıt / Answer C

2. $A=\int_1^3 x^3\,dx=\frac{x^4}{4}\Big|_1^3$

$$=\frac{3^4}{4}-\frac{1}{4}$$

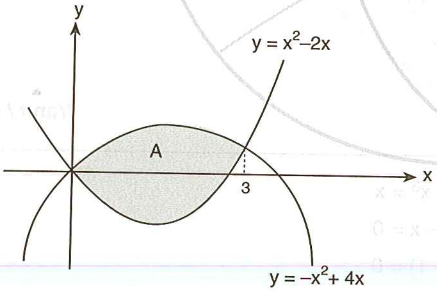
$$=\frac{81}{4}-\frac{1}{4}$$

$$=\frac{80}{4}=20$$



Yanıt / Answer E

3.



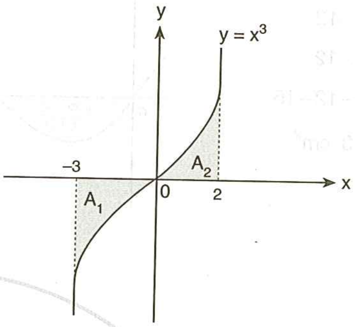
$$A=\int_0^3 (-x^2+4x-x^2+2x)\,dx$$

$$=\int_0^3 (-2x^2+6x)\,dx$$

$$=\frac{-2}{3}\cdot x^3+3x^2\Big|_0^3=\left(-\frac{2}{3}\cdot 27+27\right)-0=-18+27=9$$

Yanıt / Answer D

4.



$$A_1=-\int_{-3}^{0} x^3dx=-\frac{x^4}{4}\Big|_{-3}^{0}=+0-\left(-\frac{81}{4}\right)=\frac{81}{4}\ \text{cm}^2$$

$$A_2=\int_0^2 x^3dx=\frac{x^4}{4}\Big|_0^2=\frac{16}{4}+0=4$$

$$A_1+A_2=\frac{81}{4}+4=\frac{97}{4}\ \text{cm}^2$$

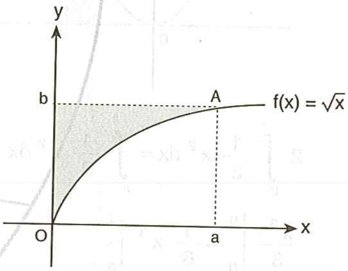
Yanıt / Answer C

5. $9=\int_0^b y^2dy\ \Rightarrow$

$$9=\frac{y^3}{3}\Big|_0^b$$

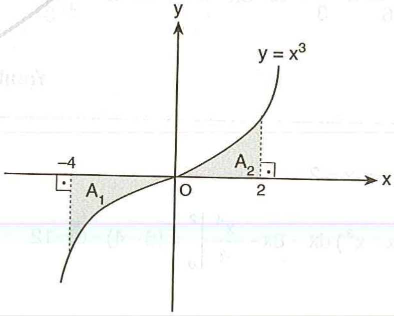
$$9=\frac{b^3}{3}-0$$

$$b=3$$



Yanıt / Answer D

6.



$$A_1=-\int_{-4}^{0} x^3dx=-\frac{x^4}{4}\Big|_{-4}^{0}=-\left(0-\left(\frac{256}{4}\right)\right)=64$$

$$A_2=\int_0^2 x^3dx=\frac{x^4}{4}\Big|_0^2=\frac{16}{4}=4$$

$$A_1+A_2=64+4=68$$

Yanıt / Answer C

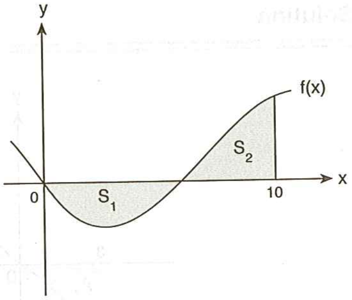
7. $\int_0^{10} f(x)\,dx = -12 \Rightarrow$

$-S_1 + S_2 = -12$

$-15 + S_2 = -12$

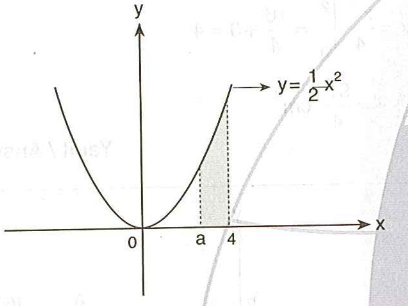
$S_2 = -12 + 15$

$= 3\ cm^2$



Yanıt / Answer A

8.



$2\int_0^4 \frac{1}{2}\cdot x^2\,dx = \int_a^4 \frac{1}{2}\cdot x^2\,dx$

$\frac{x^3}{3}\Big|_0^a = \frac{1}{6}\cdot x^3\Big|_a^4$

$\frac{a^3}{3} - 0 = \frac{1}{6}\cdot 64 - \frac{a^3}{6}$

$\frac{a^3}{3} + \frac{a^3}{6} = \frac{32}{3} \Rightarrow 3a^3 = 64 \Rightarrow a = \frac{4}{\sqrt[3]{3}} = \frac{4\sqrt[3]{9}}{3}$

Yanıt / Answer B

9. $x^3 = 8 \Rightarrow x = 2$

$S = \int_0^2 (x - x^3)\,dx = 8x - \frac{x^4}{4}\Big|_0^2 = (6-4) - 0 = 12$

Yanıt / Answer C

10. $S_1 + S_2 = \int_{-4}^{1} f(x)\,dx + \left(-\int_1^5 f(x)\,dx\right)$

$= 5 + (-(-4)) = 9$

Yanıt / Answer D

11. $f(x) = a(x-2)^2$

$f(x) = a(x^2 - 2x + 4) = ax^2 - 4x + 4a$

$4a = 4 \Rightarrow a = 1$

$f(x) = x^2 - 4x + 4$

$x^2 - 4x + 4 = 1 \Rightarrow x^2 - 4x + 3 = 0$

$(x-3)\cdot(x-1) = 0$

$x = 3\,,\ x = 1$

$S = \int_1^3 1 - (x^2 - 4x + 4)\,dx$

$= -\frac{x^3}{3} + 2x^2 - 3x\Big|_1^3 = \frac{4}{3}$

Yanıt / Answer D

12. $x^3 = x$

$x^3 - x = 0$

$x(x^2 - 1) = 0$

$x = 0$

$x = 1$

$\int_0^1 (x - x^3)\,dx = \frac{x^2}{2} - \frac{x^4}{4}\Big|_0^1$

$= \frac{1}{\underset{(2)}{2}} - \frac{1}{4} = \frac{1}{4}$

Yanıt / Answer A